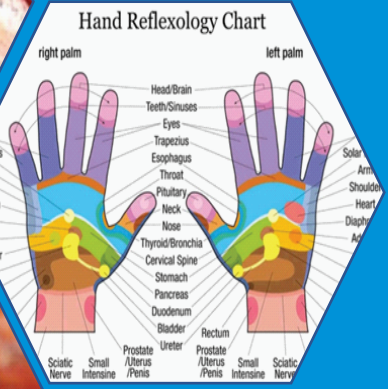
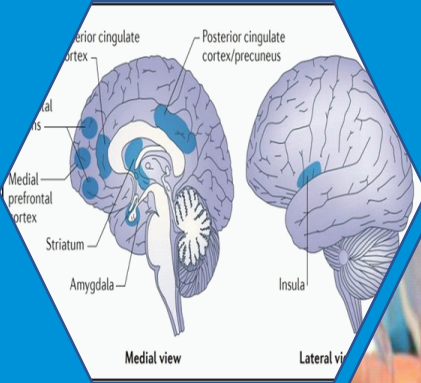


Assoc. Prof. Dr. Filiz YANGILAR



# FUNCTIONAL MEDICINE AND NUTRITION

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**Assoc. Prof. Dr. Filiz YANGILAR**



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## **PREFACE**

Having healthy individuals and a society made up of healthy people is one of the most fundamental requirements for nations to survive. Treatments other than contemporary medicine in the health system should be thoroughly understood to promote healthy individuals and a healthy community. In functional medicine, nutrition is a healing-oriented health approach that also uses other medical therapy forms. Functional medicine, complementary medicine, traditional medicine, and conventional medicine all have subfields. There are various treatment approaches for these sub-areas. Patients have turned to therapeutic modalities that are not part of orthodox medicine because of a desire for a better life and an easy and affordable technique. As a result, these techniques keep getting better and better. These therapeutic approaches have advantages, but they also have drawbacks and repercussions. Many social, political, and economic processes shape societies. We occasionally favor modern medicine and occasionally alternative remedies depending on the social context we live in. These procedures, known as traditional medicine and alternative/complementary medicine, have recently sparked new debates despite maintaining their significance since antiquity. It has been made possible by factors like the lengthening of life expectancy, rise in chronic and incurable diseases, emphasis on natural remedies, decline in confidence in modern medicine and medical professionals, decline in confidence in the pharmaceutical industry, and inadequacy of modern medicine to treat some diseases. The application and development of new ideas are successful contributions made by innovation, which we experience in many spheres of life. Health applications for mobile devices, which have increasingly become a vital part of our lives, have emerged as an extremely significant innovation in expanding the possibilities for receiving health services. More research should be done to develop these health applications because of the rapidly growing population and the need to deal with health issues. It is also the benefit of new technologies that save time and money and improve awareness of health knowledge. Current knowledge regarding functional and modern medicine applications and their impact on health, nutrition methods and studies, and traditional medical treatment approaches are covered in this book.

Filiz YANGILAR / Erzincan, Turkey



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## 1. INTRODUCTION

Since the existence of human beings on earth, health, and wellness have been indispensable necessities of life. From the beginning of time to the present, humans have attempted to consolidate this position by utilizing developing technology and scientific infrastructure in order to maintain a healthy state of being. Specialization in health began, particularly following the industrial revolution, in tandem with expanding scientific understanding and developing technology. The process that culminated in the creation of health systems was sparked by specialization and the formation of new business lines, and health systems were fashioned in accordance with the years and the political-administrative infrastructures of the countries (Akdur et al., 1998).

Although legislation and innovation studies in the Turkish health sector have a long history, the 2000s saw a new transformation and pace in health reform and transformation studies (Memişoğlu and Kalkan, 2016). Individuals who are ill are the most basic component of the health system. Individual decisions regarding their own diseases have an impact on the effectiveness and quality of health services given, as well as health outcomes (Balçık et al., 2014). According to the World Health Organization, health is not only the absence of disease and disability, but also the state of being perfectly healthy in all mental, physical, social, and psychological dimensions (Öztürk and Kırac, 2019). With people's survival times increasing, it is more crucial than ever to give a good life (Boylu and Paçacıoğlu, 2016). The desire to be healthy leads to the creation of many diverse practices or the emergence of new practices that are purposefully created by people's own efforts. Functional, traditional, alternative, complementary, and modern medicine are all examples of these techniques (Kurtdaş and Aytaç, 2014). To the extent that they are compatible with modern medical thinking, health care should be culturally suitable. The public does not prefer a health-care model that lacks cultural factors efficiently, readily, or pleasantly. Health professionals should be culturally aware of people's health structures, recognize cultural traits as a dynamic component in health and disease, and be knowledgeable and sensitive to cultural variances and similarities.

Looking back at the history of medicine in the twentieth century, the concept of function may be traced back to can be credited to Dr. Hans Selye's work. "Knowing what type of person has the disease is more important than

knowing what disease the person has." Jones (2010) provided a physiological explanation behind the statement. In general, functional medicine is concerned with chronic and complex disorders. It is a customized, protective, and all-encompassing therapy strategy. At the same time, it provides a clinical setting that demonstrates how the environment (food, lifestyle, microbes, environmental pollutants, stress factor) and genetic variables affect our body's physiological and system activities (Yılmaz, 2020). Functional medicine is an approach that interferes with the individual's basic biological imbalances in the prevention, early detection, and treatment of chronic diseases, attempts to identify the causes of the underlying disease, and attempts to reverse the disease in the direction of health (Atasoy, 2018). It determines how and why diseases occur and provides better health by addressing the fundamental causes of disorders. Encourages people and clinicians to collaborate in order to promote maximum health by addressing the root causes of sickness. Patient-centered and scientifically based (Haspolat, 2022).

According to the functional medicine concept, functional impairments in the body's physiological systems begin before chronic diseases develop. Functional medicine can be defined as the science of determining the processes that lead to chronic diseases and addressing these functional deficits. Within the framework of genetic and environmental influences, each person has a distinct biochemical individuality (Türel, 2019). It is well known that chronic illness control contributes to the economy, loss of workforce, bed occupancy, and reduction of hospital workload, and models related to chronic disease follow-up in primary care are stressed. In terms of core features, a family physician is well-equipped to monitor chronic diseases and contribute to therapy (Ak, 2010).

Individual medicine is treated in three stages. In the first layer, genetic tests can be performed to look for clinically relevant single nucleotide polymorphisms (SNPs). Although these SNPs cannot be removed, their detrimental consequences can be mitigated through the use of interventions. The epigenetic layer is the second. The equilibrium of methylation can be restored, and phytonutrients, polyphenols, and anthocyanidins can be used. Functional biomarkers are employed in the third and final layer in both traditional laboratory and functional medicine laboratories (Atasoy, 2018).

Nutrition in functional medicine is a patient-centered, healing-oriented health strategy that encompasses both traditional and alternative medical therapies (Noland and Raj, 2019). According to some studies, the reasons why patients resort to traditional treatment methods, such as the inability of healthcare professionals to devote sufficient time to patients, the avoidance of drug side effects, and the ease of access and low cost, have directed patients' attention to different areas. The adoption of these therapy approaches is expected to increase over time (Tuna, 2021). Chronic diseases are said to be directly tied to diet and lifestyle habits, and inadequate and imbalanced nutrition is linked to the development and prognosis of numerous diseases (Singh, 2008). Autoimmune illnesses related with poor dietary habits are detected in conjunction with malnutrition (Roth et al., 2002).

The integrative and functional nutrition approach highlights the importance of taking safeguards before autoimmune disease reactions arise. It also suggests using vitamin and non-mineral dietary supplements including fish oil, prebiotics, probiotics, and herbs to protect cell health (Schmidt et al., 2016). The cornerstone of functional nutrition is the correction of nutritional imbalances through tailored food and dietary supplement recommendations. When using supplements, it is critical to maintain this balance in mind. Individual calorie percentages from carbohydrates, fat, and protein must be determined. Controlled protein consumption in patients with chronic kidney disease, for example, and a low-carbohydrate, high-fat ketogenic diet in epileptic patients can both be useful (Doğan et al., 2017).

## **2. TRADITIONAL HEALTH PRACTICES**

The World Health Organization defines Traditional Medicine/Complementary and Alternative Medicine as "plant, living, and/or mineral-based drugs used alone or in combination to treat, diagnose, and prevent disease, as well as to maintain well-being." A collection of health practices, attitudes, knowledge, and beliefs that combine "spirit-body therapies, manual techniques, and practices." In this definition, hypnosis is included in the category of "soul-body therapies" within Traditional Medicine/Complementary and Alternative Medicine (WHO, 2002). Traditional medicine, also known as folk medicine, is the application of information derived from beliefs, values, and other aspects of a society's culture passed down from generation to

generation in the treatment of ailments (Ersoy, 2014; Sütçü, 2018). Traditional health practices are ingrained in local culture. Nurse to give the best possible health care, he or she should understand how the people for whom he or she cares perceive sickness and health, as well as the cultural elements that influence his or her health-related behaviors. Traditional practice refers to health and illness ideas, attitudes, and methods (Polat, 1995). When it comes to traditional practice, it refers to what is generally known as husband and wife medicine, or folk medicine. Herbal, mineral, and animal substances are used in this type of treatment. These are activities: reading, healer folk, those who only treat according to magical principles, and those who appear religious, praying, putting the patient in the tomb, praying to the tombs for healing, hitting, scratching, cutting, piercing, or cauterizing the patient's body with a healing tool called parpilama. Traditional fracture-dislocation procedures are still practiced today, even in cities (Ceylan, 2002).

Traditional health practices are widespread in Turkish society, particularly in villages (Aşkın, 1997). Humankind sought the assistance of magic, magic, and religion in order to be protected from diseases, heal when sick, and gain lifelong experiences. These factors, which are believed and trusted, have aided in the implementation of traditional health practices and ensured their continuation throughout human history. In our society, traditional patient care practices for some chronic diseases are frequently encountered belonging in the review of the literature; herbal such as black cumin, thyme, mallow, nettle, and dried pomegranate; such as eating hedgehogs, and grasshoppers; it has been determined that they apply to spiritual practices such as making amulets and go to religious teachers (Yalın, 1988; Polat, 1995). Traditional health practices are ingrained in local culture. Nurses; to give the best possible health care, or should understand how the people for whom he or she cares perceive sickness and health, as well as the cultural elements that influence their health-related behaviors.

Culture is not an innate set of characteristics; it is acquired later in life. This learning occurs because of the socializing process. The notions of society, socialization, and culture are intertwined and difficult to study separately. Every new member of society learns about the culture of the society in which lives now. In general, society and culture during interactions are always. Culture is an ongoing notion. It is passed down via generations. Traditional

medical therapies are seen as a social and cultural asset. Traditional healers have used these therapies for generations, and they have been passed down from generation to generation. While contemporary medicine is founded on scientific principles, traditional medicine is founded mostly on observation and experience. Traditional medicine does not happen by chance in this environment but is a magnificent example of order in and of itself. (Sütçü, 2018). This continuity is provided by behavior patterns (Doğan, 1999). People have been attempting to preserve particular cultural elements for many years. This view was reflected in their health habits, and persons experiencing health issues sought relief in their cultural lives. As a result, every piece of stone is a cure, every dry herb is a medication, every natural event has taken its place in the memory as a sign, and they have become an indelible part of people's life.

Traditional health practices are primitive or indigenous culture-based health methods that existed prior to the application of medical science to the health condition. Traditional health practices bear witness to the primal indigenous civilizations. Other words used for this purpose include "folk medicine", "traditional medicine", "alternative medicine", "ethnomedicine", and "illegal medical practices". In fact, all phrases employed in this context are insufficient. Because it conveys the appearance that all types of traditional medicine share common skills, knowledge, and regulations, it fails to distinguish between health care using simple procedures applied at home and other advanced approaches (Emiroğlu, 1991).

According to the NCCAM (2018), which was founded in the United States, the use of GTAT applications in conjunction with traditional therapies is referred to as complementary medicine, but the use of conventional medicine apps instead of conventional medicine is referred to as alternative medicine. The US National Institutes of Health has classified these techniques into five overlapping categories to establish a research agenda.

### **1. Mind and Body Initiatives**

- Meditation
- Relaxation techniques
- Yoga

### **2. Alternative Medical Systems**

- Homeopathy

- Naturopathy
- Manipulation (tui-na)
- Ayurveda

### **3- Biyolojik Biologically Based Therapies**

- Herbal Treatments
- Various food sources
- Minerals and Vitamins

### **4- Manipulative (Body Based) Methods**

- Massage
- Hydrotherapy (Spa Treatment)
- Chiropractic

### **5- Energy Treatments**

- Acupuncture
- Tai Chi

According to WHO, "alternative-complementary medicine" practices include non-standard health practices that require experience and have different effects, whereas "traditional medicine" includes a variety of treatments and practices that vary from country to country or region to region (Kalındemirtaş, 2010). The following are the procedures outlined in this regulation, which went into effect on 27 October 2014: (Ministry of Health, 2014).

\* Acupuncture \* Chiropractic \* Apitherapy \* Prolotherapy \* Hypnosis \* Osteopathy \* Leech application \* Phytotherapy \* Homeopathy \* Ozone application \* Cup \* Musictherapy \* Larva application \* Reflexology \* Mesotherapy

The definitions of these applications, principles of application, applicable and non-applicable conditions, and qualifications of persons who will apply them, and medical goods and devices to be used during treatment are all detailed in the regulation (Tekçi, 2017). The rule establishes the methods of traditional and complementary treatment practices, as well as the training and certification process for the physicians who will use the methods, as well as the operating principles of the health institutions where these methods will be used.

Certified physicians should use complementary and alternative medicine approaches. Otherwise, the wound may cause additional injury to the sufferer. This regulation is significant because as modern medicine advances in this arena, these applications slip into the hands of the uninformed and commercial. Studies in the field are critical in this regard.

### **3. TRADITIONAL ALTERNATIVE AND COMPLEMENTARY MEDICINE (GETAT)**

Alternative and complementary medicine have a long history, dating back to Far Eastern countries such as China. Herbal treatment was practiced in societies with shamans and traditional healers before modern medicine was discovered (Kaptanoğlu and Tosun, 2022). Humankind has used Traditional Complementary Alternative Medicine (GTAT) practices in many spheres of life since its inception (Turan et al., 2010). GTAT encompasses all types of human health applications by demonstrating a holistic perspective to events aimed at making sense of the relationship between body, soul, and mind that are outside the boundaries of today's current medical treatments. Massage, acupuncture, physical therapy, ozone treatment, phytotherapy, yoga and meditation, hypnosis, hirudotherapy, and religious rituals are examples of traditional complementary alternative medical methods (Taşçı and Başer, 2015). The acupuncture treatment regulation was the first in Turkey in the realm of traditional and descriptive medicine in 1991. The goal of this rule was to encourage the use of scientific procedures in acupuncture treatment. Following this regulation, the Ministry of Health released a much more thorough regulation in October 2014. The scope and legal instruments of traditional and descriptive medicine were explicitly stated in this law, as were the features of the trainers and health institutions to be used (Taştan, 2018). Only doctors, dentists, and pharmacists have implementation authority because they are limited to their respective areas. Nurses are not permitted to practice (Mollahaliloğlu et al., 2015). Homeopathy and osteopathy arose under the auspices of the National Institute of Health, which was designated as the first center in 1998. The goal of this center is to assure the dependability of the procedures used and the incorporation of scientifically validated applications into traditional therapeutic approaches (Kaptanoğlu and Tosun, 2022).



Traditional medicine, supplementary medicine, and alternative medicine are all terms that are used interchangeably in our nation and in certain other countries. Because of talks in this area, WHO and other health organizations have recently recommended that there are alternatives to therapy but not to medicine. This field was described as "traditional and complementary medicine" (Koçinkağ et al., 2022). The classification of alternative medicine practices is given in Table 1 (Kaptanoğlu and Tosun, 2022).

**Table 1.** Classification of alternative medicine practices

| Mind Body<br>Medicine                            | Alternative<br>Medicine<br>Systems | Biology<br>Therapies                            | Based | Manipulative<br>and<br>Body<br>Based Systems | Energy Therapies   |
|--|------------------------------------|---|-------|--|--|
| Mind-body<br>systems                             | Acupuncture                        | Plants  |       | Chiropractor                                 | a-Biofield<br><br>• Therapeutic touch<br><br>• Reflexology |
| Mind-body<br>methods<br>(like yoga)              | Ayurvedic<br>medicine              | Special<br>treatments                           | diet  | Massage                                      | b-<br>Bioelectromagnetics                                  |
| Religious<br>and<br>spiritual<br>healing         | Traditional<br>Chinese<br>medicine | Pharmacological,<br>biological<br>interventions |       | Osteopathy                                   |  |
| Social<br>areas (such<br>as holistic<br>nursing) | Naturopathy                        |   |       | Hydrotherapy                                 |  |

More research should be conducted on GTAT approaches, which have only recently gained traction in our nation and around the world. Nurses, as health professionals, must be equipped with the information and tools to teach or apply to parents developmentally and physiologically erroneous GTAT practices or good GTAT practices. The research survey aims to examine the degree of information provided to parents by examining the knowledge and attitudes of nurses working in the pediatric clinic concerning traditional complementary alternative approaches. Preventing potentially harmful habits is critical for preserving and improving health. Adults frequently use GTAT. The application of GTAT in adults varies by country. A research conducted in the

United States discovered that 38% of adults used GTAT. GTAT is utilized to alleviate disease-related symptoms and improve overall health. A substantial difference was noticed in the data obtained in the last 12 months when gender disparities were considered. It was found to be 53.5% in men and 42.7% in women (Alwhaibi and Sambamoorthi, 2016).

In general, GTAT approaches encompass the preferred health care practices, products, and methods for protecting and improving health, as well as coping with and controlling disease symptoms. With innovations in health care, an increase in treatment expenses and financial load, distrust of currently used treatment modalities, and fear of potential adverse effects, the usage of GTAT is increasing. At the same time, the fact that persons with chronic diseases cannot fully recover their health after lengthy treatment processes, as well as the presence of disease-related symptoms, are effective in the application of GTAT (Çakmak and Nural, 2017).

### **1. Complementary and Alternative Medicine Applications in Infertility Treatment**

Infertility is defined as the inability to conceive while having regular sexual intercourse with a spouse for at least one year without utilizing any method. This issue affects 13-15% of married couples worldwide. According to surveys, 47.3% of married couples use complementary and alternative medicine procedures in addition to their conventional medicine treatments. Women's utilization of complementary and alternative medicine approaches varied depending on the duration of their infertility, the duration of their therapy, and the features of their source. In this study, over half of married couples receiving infertility treatment used alternative medicine and complementary medicine approaches in addition to traditional medicine, and it was established that biology-based treatment and mind-body medicine were the most preferred ways (Kurt and Arslan, 2019).

### **2. Traditional Medicine Approach to Bioresonance Therapies**

Bioresonance therapies, sometimes known as "vibration medicine" and "energy medicine," have a long history. The term bioresonance derives from the terms bio (life) and resonance (echo, vibration). When utilized correctly, bioresonance applications are cost-effective, non-invasive procedures that

provide clinicians with relevant ideas for disease therapy and diagnosis. Biophysical investigations of bioresonance interfere with intercellular communication. A supplementary medicine technique employs low-energy electromagnetic waves during treatment. Bioresonance restores the body's natural energy flow and allows it to heal itself. As a result, the body's own defense and healing mechanisms are triggered. It allows for the possibility of early detection of various diseases. The orientation to this topic will grow as the degree of evidence in bioresonance investigations grows and more controlled-comprehensive experiments are done. Homeopathy and acupuncture are the most commonly employed applications in conjunction with bioresonance (Koçinkağ et al., 2022).

#### **4. CONVENTIONAL (ALTERNATIVE) MEDICINE**

Alternative medicine refers to procedures that are used instead of traditional medicine, whereas complementary medicine refers to ways that are used in addition to scientific therapies (Uğurlu et al., 2017). According to the European Federation of Complementary and Alternative Medicine (EFCAM), complementary and alternative medicine are various health practices used in the maintenance and improvement of health, disease prevention and treatment, and can be used independently or in conjunction with conventional medicine approaches (Anonymous, 2023f). Actually, alternative medicine is a commercialization of traditional medicine. The service offered by doctors and other health professionals who have earned the requisite training falls within the purview of conventional medicine. However, the lines between conventional medicine and GTAT applications may be blurred. Acupuncture treatment, for example, which has been used for millennia and is included in traditional medicine, has evolved into applications authorized by modern medical authorities throughout time (Sütçü, 2018). Integrative medicine refers to the combination of conventional medicine with GTAT applications that have been shown to be effective and reliable (Şahin, 2017).

Although conventional medicine is effective and valid, the increase in chronic diseases, incurable or difficult diseases, the increase in malignant diseases, the problems caused by drug side effects, the idea that naturalness is free of side effects, and the environment caused by the pharmaceutical industry in industrialized countries are all causes for concern. GTAT applications have

grown in popularity as a result of factors such as greater sensitivity to pollution, lower faith in doctors, the need to promote health behavior, the high cost of new technology, and health personnel's inability to devote adequate time to patients (Şarışen and Çalışkan, 2005; Tokem, 2006; Turan et al., 2010).

It is a field that supports or supplements conventional medicine, formerly known as alternative medicine, by remaining outside of the present mainstream modern medicine concept. Applications in this subject are employed in knowledge, skills, and practices based on beliefs and experiences, as well as in treating diseases in sick people, so that healthy individuals can live their lives in a healthy way by avoiding physical and mental ailments (Arpacı, 2021). To put it simply, "Conventional medicine kills mosquitoes, while functional medicine dries up the swamp; it does not sweep filth under the rug like conventional medicine." Although most conventional medicine diagnosis and treatment approaches are well understood now, there is still a need for complementary medicine in health protection (Koçinka et al., 2022). Alternative medicine can be used instead of traditional medicine; however, complementary medicine can only be used in conjunction with regular medicine's therapies (Kaptanoğlu and Tosun, 2022).

All kinds of health preventive and medical practices other than conventional medicine are defined as complementary and alternative medicine (CAM) and classified in five different categories;

- (1) Mind-body medicine,
- (2) Alternative medical systems,
- (3) Biological treatments,
- (4) Manulative-body-oriented systems,
- (5) Energy therapies. These five techniques are used in alternative-complementary medical systems. Traditional Chinese medicine, for example, includes acupuncture, herbal medicine, special diets, and meditative exercises such as tai chi (Debas, 2011).

Herbal therapy (herbalism, phytotherapy), which is the most commonly utilized CAM application, is classed as a biological treatment (Altun and Özden, 2004). GTAT applications, which represent a significant cultural asset, look to be a valuable asset that should be developed and safeguarded. The Ministry of Health established the "Traditional, Complementary, and Functional Medicine Practices Department" to prevent the unintentional,

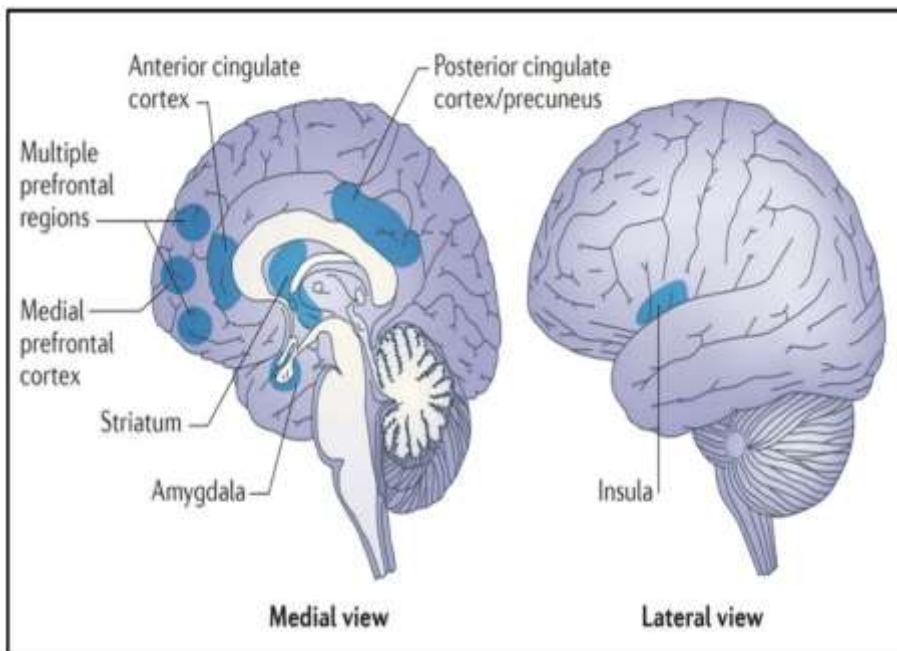
incorrect, and unauthorized application of traditional and complementary medicine (GETAT) practices in Türkiye; the "Traditional and Complementary Medicine Practices Regulation" was published. It can be triggered in accordance with this regulation by combining it with conventional treatment. Trained personnel can employ correct and on-site applications in every sector of medicine in a controlled manner. As a result, many alternative remedies are available to people who are helpless against various ailments.

## **5. TRADITIONAL MEDICINE APPLICATIONS**

### **5.1. MIND AND BODY INITIATIVES**

#### **A) Meditation**

Meditation is a type of mental training that tries to develop a person's essential psychological capacities, such as attentional and emotional self-regulation. Meditation refers to a group of intricate activities that includes mindfulness meditation, mantra meditation, yoga, tai chi, and chi gong (Ospina et al., 2007). All methods of meditation improve one's ability to develop mindfulness. The goal of neuroscientific research is to better understand the neurological systems that are used to achieve meditative states, as well as to assess the impact of regular Mindfulness practices on brain functions and structure (Treadway and Lazar, 2009). There is now growing evidence that meditation causes changes in the functioning features of the brain. Such findings are summarized below in the context of the theory of key mechanisms of mindfulness meditation (Figure 1) (Tang et al., 2015).



**Figure 1.** Brain regions involved in the components of mindfulness meditation

Mindfulness is a human trait that transcends religions and cultures. It is a state of awareness that is inherent in human beings and is available to all. This condition of awareness liberates anything from striving to be something other than what it is (Shapiro et al., 2018). Mindfulness is an enigmatic but important notion in the 2,500-year-old Buddhist psychological school. In ancient literature, mindfulness is used to translate the Pali word "sati," which combines awareness, attention, and recall (Pali is the original recording language of Buddha's teachings). Moment by moment, "Sati" is cultivated as a tool for examining how the mind inflicts suffering. It is used to cultivate wisdom and awareness, which eventually leads to pain relief (Siegel et al., 2009). Stop, observe, and reverse are the three foundations of awareness practices. Slowing down allows for greater awareness. For example, walking slower allows you to observe more of your surroundings. Observing does not mean being detached from what is going on. It is more about being a participating observer through paying attention to your own experience. When your mind wanders away from the present moment, acknowledge it and bring it back (Germer, 2009).

Meditation can be done formally or informally using a variety of approaches. Formal meditation involves the practitioner meditating for a set amount of time (such as 45 minutes per day) and using a specified method, whereas informal meditation involves being mindful during regular activities such as eating, taking a bath, or walking (Hindman et al., 2015). Almost every meditation practice begins with focusing on a specific object, therefore attentional training is a vital component of all types of meditation since it improves focus and lowers distraction (Wallace and Shapiro, 2006). The main quality shared by all meditation practices is the ability to regulate one's attention. The main quality shared by all meditation practices is the ability to regulate one's attention. Individuals feel less forced and more energized when they train their bodies on a daily basis; practicing meditation on a regular basis enhances mental stability and reduces the required cognitive effort for attention regulation (Lutz et al., 2009).

Davidson et al. (2003) analyzed the effects of Mindfulness meditation on the brain and immunity. Brain electrical activities were measured before and 4 months after participants participated in an 8-week Mindfulness meditation training. The same measurements were made for the control group. An activation has been seen in the left anterior region of the brain that has been associated with positive affect previously seen in meditation practitioners. Meditation practitioners also showed increased antibody titers to the influenza vaccine. According to the findings, it was stated that the Mindfulness meditation program had significant effects on the brain and immunity, and that meditation positively affected the brain and immune system.

## **B) Relaxation Techniques**

Emotions control the breath, as evidenced by the explanations of breathing and relaxation. When a person is angry, happy, angry, or relaxed, he or she cannot breathe in the same way. When the respiratory rhythm shifts, many things change. Alternatively, when thoughts and feelings change, so does breathing. Relaxation entails knowing how to stretch and relax different muscle groups sequentially until you achieve optional profound relaxation. This procedure ensures that the heart rate, erratic breathing, and blood pressure levels return to normal. Aids in the management of common anxiety symptoms

(Gümüş, 2006). To employ relaxation in daily life, the large muscle groups of the body, such as the hands, arms, feet, legs, body, shoulders, and head, are carefully stretched and gradually relaxed through regular workouts. Although relaxation techniques are technically grouped under specific titles, in practice, one must choose and develop his or her own relaxation technique. Individuals are supposed to be able to find their own specific needs, living situations, preferences, and, in a sense, the answer to the treatment, or they are recommended to seek support from their specialist by discussing their current position (Özel and Karabulut, 2018).

Muscle strength is essential for athletic success. When the muscles shorten, force is produced and movement occurs, while their relaxation induces another muscle to contract (Üstdal and Köker, 1998). "Myofascial (myo-connective tissue) release" is a physical treatment that has been used in many handicap instances and continues to alter the tissue today. Myofascial release is defined technically as "a gradual stretching applied to the soft tissues with the assistance of a therapist and used to remove restrictions in the soft tissues, whose application angle, strength, and duration vary for the feedback phase in the person's muscles" (Manheim, 2008). Small undulations back and forth on a dense foam roller begin in the proximal region of the muscle and flow downhill towards the distal part of the muscle in the self-administered myofascial release technique (Power et al., 2004).

The term "Social Life" refers to each individual's unique and different life in society. Each person's troubles in both his social and private life are unique. These challenges can put physical and mental strain on people. Stress, on the other hand, is a bad scenario that occurs when these stresses and people's vital boundaries are breached. Stress is an unavoidable part of life, and it is nearly hard to eliminate. Individuals who are unable to control their stress situation have poor mental health. It is feasible to deal with it, but it is a skill that must be acquired. It is well known that relaxation techniques are one of the first steps in dealing with stress and anxiety.

### **C) Yoga**

Yoga is a series of practices with an old and deep-rooted history that originated in India. Yoga, derived from the word yug, means yoke in Sanskrit



and refers to the discipline and alignment of mind and body for spiritual reasons. Yoga is believed to be gaining popularity in popular culture due to potential health benefits such as disease prevention, prevention, and treatment (Birdee et al., 2008; Köyüstü and Kırık, 2021). Yoga, which is growing increasingly popular, is a system focused on the soul, mind, and body working in harmony with each other, and it mostly comprises of physical motions, breathing methods, and meditation exercises (Juchat, 2019). Yoga practices, the oldest personal development method that can help an individual know himself through teaching the soul, mind, and body, were originally offered in BC. It first appears in Vedic manuscripts around 2500 BC. In archaeological studies of the Indus Valley, stone seals showing yoga positions have been discovered. These discoveries, which date back to the year 3000, serve as the foundation for yoga teaching and philosophy (Duyan, 2008).

The National Institutes of Health (NIH), National Center for Complementary and Alternative Medicine (NCCAM), classifies yoga as a "mind-body" CAM practice. Mind-body medicine, according to NCCAM, has a direct impact on health by focusing on the interplay between the brain, mind, body, and behavior and developing powerful pathways on emotional, mental, social, spiritual, and behavioral variables. They are approaches that respect and enhance each person's potential for self-awareness and self-care, and they stress procedures based on these principles. The purpose of yoga therapy is to tailor practices to the needs of the individual or group (Kaley-Isley et al., 2010). While males to only used it relax in India's lonely forests in the 1820s, it evolved into an exercise where we can feel fit by relaxing the soul and body, and numerous health and yoga centers were formed in the 1920s. Yoga is not a religion or a belief system; it is merely a philosophical system (Alkan and Özçoban, 2017). Actually, it is a meditation that improves people's health and well-being by working with both the mind and the body (Köyüstü and Kırık, 2021).

### **Yoga Practices**

Hatha yoga, Tantra yoga, Raja yoga, Bhakti yoga, Karma yoga, Mantra yoga, Jnana yoga, and Kundalini yoga are the most common types of yoga. Each shape aids in the concentration of attention on a specific focal point and develops self-discipline. The state known as Samadhi in Sanskrit or Hinduism;

allows for deep meditation and enlightenment (Efe and Keyvan, 2021). Yoga, which is practiced all around the world, is a blend of physical movements, breathing exercises, and meditation (Isherwood, 2006).

**Asanas:** The first of the yoga practices, asanas, are a series of movements performed in certain bodily postures. Asanas formed with the flow of breath help both physical and mental development (Iyengar, 2008; Cambridge Yoga, 2018; Sarı and Şenel, 2018). In each asana, different organs are stretched, balanced, stimulated, compressed, and disseminated into distinct anatomical positions. Fresh blood is provided to the organs, soothing massage is applied, the organs are relaxed, and health is restored (Altuntuğ and Ege, 2015; Rathfisch, 2015). Figure 2 depicts yoga asanas.



**Figure 2.** Yoga asanas

**Pranayamas:** Pranayama, which is made up of the words prana and ayama, means respiratory system, life energy, power, and breath. Pranayama exercises the breath, increases lung capacity, and teaches participants how to control their minds (Iyengar, 1979; Duyan, 2008). Extended breathing, soft breathing, and extended and determined breath-holding exercises are the three

basic movements of pranayama. Pranayama is the key process of drawing energy in and preparing the mind for the phase of eliminating emotions. The diaphragm connects the physiological and spiritual bodies, and holding energy is the knowledge of the core of the body (Rathfisch, 2015). Individuals who manage their breathing not only absorb more oxygen and energy, but they also prepare for focus and meditation exercises (Isherwood, 2006; Magee, 2013).

**Meditation:** Meditation, which falls within the purview of yoga, is a practice of tranquility that integrates mind waves into a single point and assists a person in observing and examining himself. Meditation, often defined as a state of deep concentration, is said to assist yoga practitioners relax and focus appropriately (Claire, 2004).

**Yoga Nidra:** It consists of deep relaxation and relaxation exercises performed at the end of yoga practices. Yoga nidra has a structure that develops as its practices are experienced. The important thing in this application is the gradual relaxation of the body (Cox, 2002; Sarı and Şenel, 2018).

Another source describes the fundamental concepts of yoga in eight steps (ashtanga). These are the yama, niyama, asana, pranayama, pratyahara, dhrana, dhyana, and samadhi stages (Şahin and Gürkan, 2021).

***Yama (control) and niyama (self-criticism):*** Body and mind are dominated.

***Asanas (postures):*** The body is prepared and kept healthy.

***Pranayama (energy control):*** Breath and spiritual energies are controlled.

***Pratyahara (withdrawal):*** Internalization is achieved by pulling the senses inward.

***Dharana (focus):*** The focus is fixed on a subject.

***Dhyana (deep focus):*** Information flow or healing, development, maturation about the focused subject is provided.

***Samadhi (superior focus):*** Integration is experienced (Öz, 2020).

The majority of yoga practices center on "pranayama," or breathing techniques that help calm the practitioner's breathing. Because of deep and slow exhale, the vagus nerve, which is responsible for the bodies resting and digesting processes, plays a stimulating role from the brain to the abdomen. It

lowers the heart rate by increasing the release of acetylcholine. As a result, changing the physiological reaction to stress with simply breath control becomes possible. Furthermore, "asanas," or physical activities in yoga, are used to establish posture, which is a fundamental component of meditation and pranayama techniques. It is not necessary to be flexible to practice yoga. Everybody can practice yoga and customize the moves to their liking. Thus, the person can have a more flexible body, an upright posture and a healthy spine (Manfredi and Huber, 2017).

B.C. In the second century, a man named Patanjali compiled existing yoga books and practices into a book known as the Yoga Sutras. The opus consists of 195 aphorisms (sutras or aphorisms) that represent the most original concepts about yoga philosophy and practice. The essence of yoga, which is equal and respectful to all social values, genders, ethnicities, viewpoints, and beliefs, is divided into eight steps by these sutras (Bryant, 2009). Yoga is estimated to have originated around 3000 BC, based on images depicting yoga positions discovered in archaeological digs in the Indus Valley (Derin, 2011). Yoga is now more commonly connected with physical activities. It is also used for spiritual development such as self-discovery and understanding of spiritual identity, expanding consciousness, as well as promoting health.

Meditation defined as sitting quietly and concentrating, can help a person stay calm by facilitating mental focus in everyday life, particularly in stressful circumstances such as emergency rooms. Body, breath, and mind are the three primary tools in yoga (Ergüven et al., 2023). The goal of yoga is to achieve mental and spiritual harmony by exercising the body and meditating with proper breathing techniques (Şahin and Gürkan, 2021).

### **Pregnancy Yoga**

Physical flexibility, controlled breathing, physical resistance, inner calm, and peace are required for a good pregnancy and birth. As a result, yoga is required (Akarsu and Rathfsch, 2018). Yoga poses during pregnancy maintain the body healthy by improving balance and back strength, providing hip flexibility and breath control, keeping the mother calm throughout labor and postpartum, and strengthening the mother-baby bond (Yurtsal and Eroğlu, 2019). Regardless of the pregnant woman's overall health and exercise habits, experts usually agree that pregnant women can begin practicing yoga as early

as the 12th week. More emphasis is being placed on the fact that yoga boosts a mother's self-confidence for birthing, reduces pregnancy-related stress, and is extremely beneficial to pregnant women (Tıǧlı, 2019). Pregnant women should be prepared for numbness that may occur while lying on their back after the 25th week of pregnancy. This is caused by the pressure of the fetus, uterus, and amniotic fluid on the great vein. Pillows should be used to support the back, shoulders, and head while lying on the back and raised 45 degrees off the floor (Rathfisch, 2012).

No adverse conditions such as vital signs, oxygen levels, heart rate, decrease in fetal movements, uterine contraction, vaginal bleeding, or amniotic fluid leakage were observed in studies conducted to test the reliability of yoga during pregnancy (Aksoy and Gürsoy, 2021). The foundation of the practices during this period is offering comfort to the expectant woman, preparing her mentally, physically, and mentally for birth, and assisting the baby to settle in the birth canal in the proper position. These applications developed in recent weeks will make it easier for the expectant woman to get the inner direction she will require throughout childbirth. In the last trimester of pregnancy, relaxin hormone increases and causes relaxation in muscles, tendons and ligaments; asanas that can cause excessive stretching should not be done (Lekos and Westgage, 2014).

### **Studies on Yoga**

Some yoga techniques have been shown in research to promote physical and mental health by regulating the sympathetic nervous system, hypothalamus, pituitary gland, and adrenal axis (Tıǧlı, 2019). Yoga has benefits such as lowering body fat mass, improving lean mass and preventing weight gain. According to the studies, Mooventhan and Khode statistically established that taking 10 minutes of yoga practice in the morning six days a week had a positive effect on weight loss in a study with 40 yoga and 39 control groups in persons aged 18-27 (Önen and Karabudak, 2021).

Rosenblatt et al. (2011) included 24 study groups aged 3 to 16 years in their study to assess the therapeutic benefit of a new movement-based complementary and alternative medicine strategy in young children with autism. According to the findings of the research, a movement-based program

that includes yoga and dance is successful in treating the behavioral and certain basic aspects of autism, particularly in children of preschool age.

In a research of adult cancer patients, it was discovered that practicing yoga improves quality of life and has beneficial effects on sleep disturbances (Cramer et al., 2017). When it comes to the influence on cancer-related fatigue, a meta-analysis study found that eight-week yoga practices reduced cancer-related fatigue and so might be employed in therapies (Özdemir and Gerçeker, 2022). Another study found that women who practiced yoga on a regular basis during their pregnancy had fewer pregnancy symptoms such as stress, anxiety, sadness, and exhaustion (Şahin and Gürkan, 2021).

Sabina et al. (2005) used a 45-person experimental and control group to investigate the effectiveness and feasibility of a yoga and breathwork intervention to enhance clinical indices and quality of life in persons with mild to moderate asthma. The study found no statistically significant difference between the experimental and control groups. As a result, it has been proposed that Iyengar yoga offers no meaningful benefit in the treatment of mild-to-moderate asthma. Yoga has been demonstrated to assist children minimize discomfort, improve physical ability, and lessen negative conditions including aggression, melancholy, and anxiety (Stephens, 2017; Nanthakumar, 2018). Yoga is the best treatment for postural issues. Positions that improve balance straighten the spine and strengthen the lumbar extensors and hip extensors, improving postural dysfunction and boosting the person's balance (Adaiçi and Ray, 2023). People who find cure with yoga believe that treatment in modern medicine is carried out with the use of medications, and that drugs injure the body by temporarily healing disorders (Derin, 2011).

Thiyagarajan et al. (2015) investigated the benefits of yoga on high blood pressure, which is a known risk factor for cardiovascular disease morbidity, as well as on individual lifestyle changes; it was concluded that yoga contributes to the reduction of high blood pressure and encourages individuals to revise their lifestyles positively.

D'souza and Avadhany (2014) split children aged 7 to 9 into physical activity and yoga groups and assessed their flexibility, endurance, and strength. The yoga practiced over a three-month period was said to have strengthened the respiratory muscles of the yoga group and improved their physical performance. Depression, epilepsy, anxiety, post-traumatic stress disorder, and

chronic pain exacerbated by stress; disorders characterized by reduced GABAergic activity. These symptoms and disorders appear to respond to pharmaceutical treatments that boost the activity of the GABA system. Yoga activities that stimulate this system, in addition to medical treatments, can give symptom relief as a supplemental treatment in various conditions. A study found that yoga practices help restore the reduced PNS and GABAergic activity that underpins stress-related illnesses (Streeter et al., 2002).

Woolery et al. (2004) recruited 28 volunteers to evaluate the emotional states of slightly depressed adults aged 18-29 after a 5-week Iyengar yoga session. Working results revealed that those who took the yoga course showed significant reductions in depression and trait anxiety symptoms. However, studies with larger sample sizes and more difficult methodological approaches are required to uncover the effects of yoga on mood disorders.

A Delphi study for the design of yoga interventions in musculoskeletal diseases suggested that the minimum duration of yoga intervention be 8 weeks, the minimum yoga session duration be 60 minutes, the frequency of yoga sessions be once a week, and the frequency of home practice be 30 minutes at least three times a week. Safety principles should be considered when carrying out yoga activities, and the ideas of integrating yoga practice into the participants' daily lives should be highlighted. Yoga instructors should hold a recognized yoga teaching qualification and have prior experience teaching yoga to those suffering from musculoskeletal problems (Ward et al., 2014).

According to Badsha et al. (2009), 47 individuals with RA were randomly allocated to the yoga group (n = 26) or the control group (n = 21). While the yoga group received a 6-week, twice-week, 1-hour program that included stretching, strengthening, meditation, and deep breathing, the controls received theoretical information about the yoga and RA support groups. The number of sensitive joints, swollen joints, disease activity score (DAS 28), and Health Assessment Questionnaire all improved significantly in the yoga group, but there was no change in the control group.

In a trial of young individuals with rheumatoid arthritis, the Iyengar Yoga intervention, used twice a week for six weeks, was proven a practical and safe supplementary therapy that improves health-related quality of life, pain, fatigue, and mood. Furthermore, benefits in quality of life, pain, and mood persisted during the 2-month follow-up (Evans et al., 2013).

When the international yoga literature is examined, the following diseases or health conditions are found to be associated with yoga: epilepsy, fibromyalgia, migraine, back pain, premenstrual syndrome, menopause, autism, cancer, obsessive compulsive disorders, autoimmune diseases, musculoskeletal diseases, hypertension, asthma, type 2 diabetes, cardiovascular diseases, IVF treatment, attention deficit-hyperactivity, pregnancy, substance abuse, carpal tunnel syndrome, and rheum Yoga has been reported to provide relaxation and relaxation for individuals, cure anxiety and depression levels, improve low back pain and shortness of breath by balancing their blood pressure, and make individuals competent in terms of pain management in the majority of systematic reviews and randomized clinical studies conducted on this axis. Yoga has grown in popularity as a form of physical activity that can provide considerable health and quality of life advantages. One of the main reasons many individuals practice yoga is to alleviate musculoskeletal pain. Taken together, research demonstrates that yoga is a relatively safe and feasible choice for many patients with rheumatic disease. This holistic approach, with an emphasis on improving awareness and stress reduction, can be utilized to promote psychological well-being, reduce pain, and boost function and involvement as part of comprehensive disease management.

#### **D) Hypnotherapy**

Today, hypnosis is employed as a sort of treatment (hypnotherapy) in many fields. The British Medical Association officially acknowledged hypnosis in 1955, and it was recommended that it be taught in medical schools. Hypnosis was publicly recognized as a safe and effective treatment by the American Medical Association and the American Psychiatric Association in 1958 (Sadock and Sadock, 2008). Hypnosis has been practiced since 5000 BC. The French Anton Mesmer (1734-1815) was the first to draw attention to the medicinal use of hypnotic phenomena and was the first to use hypnosis as a therapy technique in the field of medicine. He believed that our bodies contained a magnetic fluid and that the passage of this fluid had a healing effect (Taştan, 2014; Özakkaş, 1985). The American Medical Association's official definition of hypnosis is Dave Elman's definition, which is as follows: "Hypnosis is the state of overcoming the critical thinking factor of consciousness and accepting an acceptable selective thought in the



subconscious" (Elman, 1964; Uran, 2011). Recent breakthroughs in clinical medical hypnosis applications have shed light on a better understanding of the hypnosis mechanism. This procedure also resulted in the establishment or revision of hypnosis definitions and clinical applications of medical hypnosis.

It is a mental condition in which the person voluntarily and gladly participates in the suggestions and direction offered by a therapist and accepts responsibility for his own treatment (Set and Taştan, 2012; Elkins et al., 2015). Hypnosis is one of the oldest modalities of treatment and is regarded as the "golden key" to accessing the subconscious. It is used in conjunction with mental animation, that is, visuals and the doctor's vocal repeat. In complementary and alternative medicine, hypnosis administered by skilled health staff or a doctor is regarded as a reliable method of treatment (Erel and Erel, 2014). Hypnosis is characterized as a state of vigilant consciousness in which emotions are converted into inner experiences such as cognition and imagination, and it is recognized as conformity with the recommendations offered (Uran, 2018; Williamson, 2019).

Clinical hypnosis is now utilized as an adjunct to general anesthesia rather than as a replacement. The transition from experimental trials to ordinary clinical treatment is hampered by scientific norms. Because measurable physiological factors are difficult to find in the hypnotic state. It is nearly impossible to perform double blind testing. Recently, conscious sedation in anesthesia has gained prominence, sparking interest in hypnosis. In practice, hypnoanalgesia is a combination of pharmaceutical analgesia and sedation combined with hypnotic treatments. This is how he got into regular practice (Özgök, 2013). Trance states that we normally experience in our daily lives contain hypnosis. For example, we may be hypnotized when reading a wonderful book, walking down a familiar path without realizing it, praying, or meditating. In truth, hypnosis is a natural component of our daily lives when we engage in repetitive or creative activities (Williamson, 2019).

Hypnosis is defined as a state of attentive awareness that is diffused throughout the surroundings where the person's attention and focus are concentrated (Telli, 2020). At the same time, it is the condition of awareness that allows a person to reach a state of consciousness transformation and profound relaxation by increasing attention (Öztürk and Öztürk, 2019). It is neither a condition of sleep nor an unconscious state (Altundağ, 2015).

Hypnosis is commonly used for sedation, anxiety reduction, and analgesia (Özgünay and Eminoglu, 2021). It is a state in which the person is unaware of what he is doing or what is truly going on and the unconscious mind takes over. Awareness under Conscious Hypnosis (AUCH) adlı kullanılan bir teknik vardır. This technique is thought to affect the patient's emotions, memory, attention, perception, and senses in terms of psychological, social, and physiological elements (Gönçe, 2020). During the hypnosis approach, the therapist focuses the person's mind in a positive direction and increases blood flow to the limbic region of the brain. Endorphins that offer serenity and comfort are released, the body relaxes, the influence of pain and restlessness on the individual lessens, blood sugar returns to normal, heart rhythm is regulated, blood pressure falls, and the mind relaxes; beneficial results are seen in the form of (Sunar and Görmüş, 2020).

According to studies, an obese person who underwent 17 hypnosis sessions over a six-month period lost weight and enhanced his motivation. Furthermore, when we looked at the weight controls by interviewing the patient every 15 days without stopping the interviews, it was found that the patient continued to lose weight (Özer et al., 2014). Elliotson was the first to employ hypnosis for purposes other than surgery and pain relief in cancer. He improved the skin and reduced the size of an inoperable bladder tumor using hypnosis three times a day. When the patient died, no cancer was discovered in his autopsy (Özakkaş, 1985). It is used to treat hyperemesis gravidarum, nocturnal enuresis, sleep and eating disorders, obesity, depression and anxiety disorders, smoking addiction, wart and allergic skin findings, phobias, and a variety of painful illnesses (Shenefelt, 2018; Chiu et al., 2018; Taştan et al., 2018).

During hypnosis, consciousness is deactivated in the brain by switching to alpha and subsequently theta waves, and the essential treatment is administered by sending the desired messages to the subconscious along with the necessary suggestions. With situations, this can be accomplished through influencing the subconscious;

1. Changing the symptoms of the disease by suppressing it
2. Elimination of stress
3. Gaining new habits
4. Strengthening or weakening attention and memory

5. Situations such as making the person see himself as he wants can be realized (Ceyhan and Yiğit, 2013).

Another use of hypnosis may be found in various sciences and fields throughout the history of Turkish and Turkish-Islamic civilization, such as music therapy and the hypnotic and healing effects of music. Sufism is one among these disciplines. Sufism emphasizes the healing and therapeutic effects of music and kinetic trance; it is believed that in the Semah ceremonies, the Whirling Dervish enters a kind of ecstasy (hypnotic trance) state and reaches God and the Truth through a spiritual and inner journey, and that what is received from God is distributed to the People through the metaphorical expression of the whirling ritual (Ak, 2006; Somakç1, 2015).

Gödeş (2013), if you need to go to the toilet frequently, you should wake up if your need to go to the toilet is low, and you should keep it. The imagination is completed because of the client's response. In this way, it has been discovered that the client lives in daily life by following these animations performed because of hypnosis. Treatment using hypnosis, which is commonly utilized in chemotherapy, has been demonstrated to have a significant impact, particularly in pediatric patients. It has been shown that hypnosis used prior to chemotherapy reduces nausea and vomiting and serves as a source of healing for patients (Özdelikara and Arslan, 2017). In forensic instances, the hypnosis procedure is also applied. Especially in cases where the victims are found guilty or where the trials are stopped owing to a lack of evidence, the statements obtained using the hypnosis procedure help to lead to actual results (Dumanlı et al., 2015).

In children, hypnosis is a therapeutic treatment for problems such as learning difficulties, academic success, and fear of the dark, thumb sucking, urine incontinence, and anxiety. It can be beneficial in the aftermath of traumatic situations such as parent death or divorce (Gödeş, 2013). When the literature is evaluated, it is said that the studies done are more effective than the distraction and relaxation strategy in the treatment of delayed and expected nausea vomiting in pediatric patients receiving chemotherapy (Gürcan and Turan, 2019). Hypnosis is commonly utilized in the treatment of all anxiety disorders and can be easily combined with other therapy modalities for symptom management and acceptance. It is a powerful tool for eliciting the

implicit meanings that generate fear (Alladin, 2016). Obesity, disordered eating, anorexia nervosa, bulimia, and other eating disorders. Hypnosis has had very beneficial effects in managing emotional gaps in eating disorders and getting to the base of the memories or trauma that generated that emotion. In this aspect, hypnosis makes a substantial contribution to treatment (Mantle, 2003). There has been numerous research on the use of hypnosis to treat addictive substances. Hypnosis and functional magnetic resonance imaging (fMRI) scanning are also used in the therapy of smoking addiction to evaluate changes in the brain (Boland and Wark, 2018; Li et al., 2019).

Randomized controlled clinical trials on the effects of hypnosis during labor have found that it reduces the need for analgesia during labor, decreases the use of oxytocin used to facilitate labor by stimulating the uterine muscles during labor, and increases the incidence of vaginal delivery (Cyna et al., 2004). Until recently, it was not commonly employed in the treatment of depression since it was assumed that using hypnosis in depressed patients would exacerbate their suicidal propensity.

Today, studies have defended hypnosis by debunking these myths, demonstrating that it is safe and effective in both outpatient and inpatient depressed patients (Alladin, 2012). Chronic pain is defined as pain that lasts longer than six months. Unresolved pains in humans generate physical and psychological issues. Many patients with chronic pain are unable to be treated despite medical interventions such as analgesics and physical therapy, so they seek alternative treatments. Numerous controlled research has shown that hypnosis is useful in relieving chronic pain linked with medical procedures (Patterson and Jensen, 2003; Elkins et al., 2007).

Although most patients find it simple and quick to adjust to the prosthesis and appliances used in dental treatments, the process can be lengthy and difficult for other patients. It has been demonstrated that hypnosis treatment allows these persons to adjust to their prostheses and appliances more swiftly and effortlessly. The effect of hypnosis on the motivation to utilize removable appliances in children aged nine to eleven receiving orthodontic treatment was investigated, and it was discovered that hypnosis had a favorable effect on boosting cooperation (Trakyali et al., 2008).

T.R. in accordance with the Ministry of Health's regulations, "Traditional and Complementary Medicine Education Centers" were established within the

education and research hospital and medical faculty or dental faculty health practice and research center (Anonymous, 2023c). Traditional and Complementary Medicine practice unit "with certificate in the relevant field. It refers to the units established within the body of public and private legal entities, as well as health institutions owned by real people, to carry out the practices specified in the "Traditional and Complementary Medicine Practices Regulation." (Anonymous, 2023d).

T.R. The Ministry of Health has taken an important step towards scientific research and studies on medical hypnosis with the "Regulation on Clinical Researches of Traditional and Complementary Medicine Practices" published in the Official Gazette on March 9, 2019 and numbered 30709 (Anonymous, 2023e). Hypnosis has the potential to be therapeutic for persons suffering from sleep difficulties. Hypnosis appears to aid patients with primary insomnia, perimenopausal hot flashes, or post-traumatic stress disorder accompanied by secondary insomnia, somnambulism, nocturnus (sleep terror), and sleep-related enuresis (Becker, 2015).

The regulations, studies, and inspections carried out by scientific and legal authorities and institutions are critical for the future and development of medical hypnosis, as well as for public health, in this process of developing the use of hypnosis in the medical and scientific field and clinical applications. Only physicians with a license to treat and a hypnosis practice certificate are doing important steps to ensure that public health authorities carry out audits for the adoption of hypnosis.

### **E) Music Therapy**

Music therapy, one of the domains of Complementary Medicine, is a personalized music practice with the assistance of a professional doctor and therapist in order to support or safeguard the individual's physical, mental, or cognitive health treatment. Music therapy applications are tailored and focused. Music therapy techniques are founded on psychology, behavioral therapy, learning theory, and holistic humanism views, and interact with fields such as medicine, psychology, musicology, social sciences, and pedagogy. All of this takes place inside a therapeutic framework.

One of the domains of Complementary Medicine is music therapy, which is a personalized music practice with the assistance of a professional doctor and

therapist to support or safeguard the individual's physical, mental, or cognitive health treatment. Music therapy applications are customized and targeted. Music therapy techniques are based on psychology, behavioral therapy, learning theory, and holistic humanism perspectives, and they collaborate with fields such as medicine, psychology, musicology, social sciences, and pedagogy. All of this occurs inside a therapeutic framework (Gençel, 2006).

The person's psychological condition is influenced by everything from his surroundings to the music he listens to. As a result, music is present in all locations where we eat. Because we act according to the beat we hear, the owners of the venues have picked appropriate music. Restaurant owners, for example, who want us to spend more time there, prefer slower, calmer music, such as classical music. In this manner, incoming clients will remain longer and order more items. Fast rhythm music, such as pop and remix, is played in settings where tables and chairs are sparse. The goal is for customers to eat quickly and leave. Music has been used to heal numerous disorders due to the improvement of its effect on human psychology. Shamans, whose primary function was to cast magic, found rhythm, dance, and music in order to lead tribal religious devotion. Until date, music applications have been developed to treat a variety of ailments (Çoban, 2020).

Music therapy is the therapeutic application of tailored and structured music practices by a qualified music therapist in accordance with the patient's (or therapy recipient's) needs. Music's complex impact on humans has led to its application in treatment (Suhartini, 2008). As illustrated in Table 2, music therapy can be offered in a variety of ways, including active engagement (playing instruments/singing) or passive participation (listening). The therapy can be done at home or in nursing homes, with either one-on-one or group sessions (Bruscia, 1998; Lam et al., 2020).

**Table 2.** Modalities of music therapy

| Modalities               | Description   |
|--------------------------|---|
| Song writing             | Usually under the guidance of a music therapist in a group session, patients write lyrics for a melody. |
| Directed music listening | Music is played to patients in individualized sessions, sometimes according to their preference.        |

|                                |  |
|--------------------------------|--|
| Music and relaxation exercises | Patients stretch and breathe to the rhythm of music.   |
| Lyric discussion               | A group-based session where patients discuss the lyrics of a song with each other, often in the presence of a music therapist. |
| Singing/Toning                 | Patients sing to accompany a given melody with lyrics  |
| Moving to music                | Patients move or dance to songs.   |
| Recording and video creation   | Patients participate in producing a music recording or video.  |
| Adapted instrument lessons     | Patients learn to play musical instruments with the difficulty adapted to their personal condition.                            |

The style of music and how it is delivered conveys the listener's mood (Utebay, 2020). Music influenced individuals by inducing hypnosis and occasionally giving people direction for a set amount of time. In many civilizations, music, which has the ability to enhance emotions, strengthens religious feelings (Örçen and Kalay, 2021). Music as an external stimulation to the human brain is employed in the treatment of various ailments because it alters neuromediator levels in the brain (Özbek, 2022).

It is now employed in a variety of medical sectors. Its therapeutic efficacy is used in acute care units, psychiatry clinics, cardiology clinics, and oncology clinics. It is also used to improve learning concentration, relieve tension, and promote physical activity. It is applicable at any age. Many studies have proven that classical music has a therapeutic influence on ailments. It is vital to know what the body and soul want in order to use it for healing. The disease in our bodies can be defined as the shadow of the disease we have produced in our brains. This shadow can be eliminated with music. His music has a pulse that determines the pulse of the listener. The pre-, intra- and post-operative effects were investigated on approximately 97.000 patients. 97% say they help them relax and report less need for narcosis (Karamızrak, 2019).

Music therapy is nearly as old as human history, and it was used in many places using diverse methods in very ancient times (Sezer, 2019). It was discovered that the earliest Turkish music therapy experiments were conducted during the Seljuks and Ottomans (Sezer and Atıcı, 2010). The first Sufis in Islam were intrigued, claiming that music therapy helps people mature and

cures mental ailments (Giray, 2008). Scientists in the Ottoman Empire have discovered their effects on authorities and diseases (Özbek, 2022). There are two basic reasons for using music in treatment, regardless of whether method is chosen. The first is the use of music as a therapeutic support tool; the second is the use of music to enhance or promote connection and self-expression in the context of a professional or therapeutic relationship (Darnley-Smith and Patey, 2021). The physical features of the song are highlighted in the initial use. The therapeutic interaction plays a secondary role here, with the emphasis on the physiologically supporting effects of musical vibrations on the body. Its second application is widely recognized in many parts of the world, and as a result, several methods for enhancing engagement and self-expression have been developed.

### **History of therapy with music**

Both health professionals and musicians attended the Psychological Therapy Workshop, which was founded between 1985 and 1988. Music therapy applications were applied in several institutions during the same years in patients with headache, facial paralysis, joint and soft tissue injuries, prostate, muscle and bone illnesses, schizophrenia, and depression (Gao, 2008). The Music Academy in Wrocaw was Poland's first music therapy center. In 1996, the Polish Association of Music Therapists was established. Because of its collaboration with the Music Therapy Department of the Music Academy, this 100-member society has been producing the Polish Music Therapy magazine four times a year since 2002 (Kayım, 2017). Between 1960 and 1990, certain doctors in Portugal recognized the value and impact of music in the field of medicine and undertook music therapy research. Music Therapy Association brought music therapy pioneers like Benenzon to Portugal and held music therapy conferences (Leite, 2002).

Music therapy was introduced in Soviet Lithuania at the end of the 1970s, and it was developed by researching the effect of music therapy on psychological and central nervous system problems. The Holiday Village Treatment Research Laboratory was created shortly after. Some psychiatrists became interested in music therapy in the 1980s, but the struggle for independence hampered these investigations (Krout, 1997). The "baksa" lovers, a form of minstrel tradition from shamans to the present, are known as "bahshi"



and "baksi" nowadays. Bakss use kemençe known as Kopuz and Kyak. Baksi is a type of shaman and healer. It is also intuitive to improvise in order to treat the patient. The Kyak is a traditional instrument used by the Kyrgyz Turks, and it has been observed that people living in the Altaylar, Urumçi, and Kaşgar districts continue to play it now (Güvenç, 1993). The Selçuk and Ottoman Turks are known to have treated the mentally ill using music in addition to medicine in the hospitals they founded in Damascus, Cairo, and Bursa. The hospital was established in 1154. Kalavun hospital is another comparable facility. In 1154, the first applications were documented in hospitals such as Damascus, Cairo, and Bursa, and applications were made for mental ailments and bodily diseases. Music therapy practices, which were successfully applied until the 18th century, were recorded with the notes of Evliya Çelebi (Çoban, 2005; Ak, 2013; Çoban, 2020).

### **Treatment with Music in Antiquity**

People in primitive cultures believed that they could communicate with spirits through the sound of drums or other sounds, and medical physicians attempted to heal patients using music and dance in addition to remedies. Furthermore, it has been claimed that music, dance, rhythm, and songs are utilized to control bad beings, and that sound and music are employed in the same way to interact with spirits and hidden beings (Sezer, 2019). In Nigeria, patients are known to be treated with music and dancing. Eskimo shamans are said to have healed the sick by playing the tambourine with sticks. It is reported that some cult members in Nevada and California may produce beneficial effects with whining, drums, and other instruments (Ak, 1994). Again, in ancient Egypt, music was used in temples to provide well-being, awakening, strengthening intuition and self-realization (Davis et al., 2008). The gong called Lo was used in Ancient China to smuggle evil spirits and demons away from the sick (Dobrzynska et al., 2006).

According to Hebrew texts, the prophet David relieved the frenzy and anxiousness of a monarch named Saul by stealing rebab. Moses is reported to have urged his followers to read the Torah in a melodious, speech-like style. The Hebrews utilized hymns in religious, war, and burial ceremonies (Ben-Nun, 2013). Plato believed that music provides tolerance and consolation by altering the depths of the soul through harmony and rhythm. Music has been

judged useful for both cheering up and soothing bad feelings (Ansdell, 2004; Dobrzynska et al., 2006). Again, in ancient China, it was thought that music could lead people to well-being and health, curb impulses, relax and reduce sadness (Li, 2015).

Music therapy can be utilized on infants, the elderly, adults, and children. It is most commonly used in hospitals in psychiatry, palliative care, surgical operations, radiation, obstetrics, and pediatrics units, in the treatment of chemotherapy patients, in the treatment of pain and anxiety symptoms, in building physical resistance, and in increasing spiritual well-being. It is a low-cost therapy procedure that is simple to apply and has no negative effects (Taşçı and Başer, 2015).

In a study with 30 nurses and doctors who accepted Altundağ Dündar's (2011) research, 30% used music therapy for anxiety, 20% for pain, 16.7% for pre-operative patients, and 13.3% for pre-operative patients. It is reported that it is utilized for intensive care patients and 10% of sad people. Cığerci et al. (2016), in a study to determine the views of health professionals on music therapy, 68% of the health professionals (106 nurses and 113 doctors) knew how to practice music therapy, and 98.1% of the nurses and 98.2% of the doctors had any knowledge of music therapy. He was said to have received no training. Because of this survey, it was discovered that the practice of music therapy was well known, with positive attitudes toward it.

### **The effect of music on psychology**

Music therapy is a discipline of health care that uses music in a variety of physical, functional, psychological, and educational settings to aid in the treatment of the physiological and psychological impacts of an illness or disability (Uyar and Korhan 2011). Psychology is significant in music education since it has a large impact in the field of education. Researchers have repeatedly researched it in order to boost the impact of education and make it more efficient and entertaining. Music education is carried out through protecting the integrity of consciousness and sentiments, as well as continuing with instrument and voice education. Psychologist Granville Stanley Hall music has developed a primarily experimental and measurable sector for research by combining music and psychology to achieve instructional outcomes (Rideout, 1982; Aksoy and Göklen, 2022).

Appropriate music has been shown to have a strong effect on brain waves that lead to a state of deep relaxation, and it is now accepted as scientific evidence and a therapeutic model proving its psychological and physiological benefits (Winter et al., 1994, Smolen et al., 2002). Music sounds are perceived in the auditory center because of many signals being processed and evaluated. Signal transmission to various areas of the brain begins in response to heard music. Non-musical motor, sensory, and cognitive processes such as making sense of music and lyrics, comparing them to previously recorded music, forming emotions corresponding to the perceived music, and creating movements compatible with the rhythm and scale of the music all take place because of these regions' participation in musical processes (Torun, 2016). Psychology's Importance in Music Education It has also been demonstrated in the international setting by Hargreaves (1986), Rideout (2002), Rideout (1982), Hargreaves et al. (2003), Hodges (2003), Parncutt and McPherson (2002). According to the findings of the studies, obtaining instrument training for four years is one of the most essential sub-titles in the field of music education (Aksoy and Göklen, 2022).

### **The therapeutic aspect of sound**

People have sought several therapies or cures throughout history. One of them is music therapy. Despite the fact that music is a vital tool for protecting and improving people's physical and psychological health, it is well known throughout the world and Turkish history that music is useful in terms of assisting the treatment of physical or psychological ailments. Music promotes concentration and engagement through the effects of hearing and feeling. A person with brain impairment, for example, may struggle to understand and reflect about complex events. These individuals may react to musical stimuli that they enjoy and are accustomed to by smiling, sobbing, blinking, and making eye contact. It can enable basic reactions to be seen in those who have difficulties reacting with the effect of music to hear and feel. During this time, people with severe mental impairment may also react to music. As a result, the therapeutic value of music should not be overlooked. Music therapy entails the therapist utilizing music experiences and the relationship that develops between himself and the client to improve the client's health (Bruscia, 2016).

Music therapy is defined by the World Music Therapy Federation as "the use of music and/or musical elements to develop and enhance a person's or group's communication, relationship, learning, expression, mobilization, organization, and other relevant therapeutic elements needed to meet their physical, emotional, social, and cognitive needs." A professional music therapist creates and employs musical instruments (sound, rhythm, melody, and harmony). Music is an essential component of most people's life. Music therapy has been used since antiquity. Because music has the ability to increase emotions, it has been employed as a preferred approach in many civilizations to strengthen spiritual feelings and treatment (Somakçı, 2003).

Music treatment approaches were used in madrasahs and hospitals during the Seljuk and Ottoman periods. With the belief that saz and makams feed the spirit, the Ottomans integrated medical therapies with music in the treatment of mental and mental diseases (Güner, 2007). Music therapy was employed by the ancient Greeks to heal the mentally ill. Many philosophers have stressed the healing function of music and its balancing aspect in mind and body, from Western philosophers to Pythagoras to Aristotle, from Plato to Schopenhauer and Nietzsche (Wigram et al., 2002). The history of music therapy, which is very important in people's lives and treatment processes, may be traced back to America, Africa, Asia, Europe, and many Turkish cultures (Gençel, 2006).

The two essential structural features of music determine whether it is happy or sad. The first is tempo-rhythm, while the second is maqam. It refers to the fact that the sound formation with a makam system has a certain string. The number of beats per unit time is referred to as the tempo. A quick tempo elicits feelings of happiness, while a sluggish pace elicits feelings of despair. Similarly, major maqams elicit feelings of happiness, while minor maqams elicit feelings of grief. As a result, maqam and tempo shifts elicit a variety of feelings in the listeners (Çoban, 2020).

Music's rhythm regulates a person's heartbeat and gives bodily-spiritual-mental well-being. Music has been shown to improve numerous factors, including learning, thinking capability, learning to read and write faster, improving the education of children with learning disabilities, and obtaining the ability to express (Çelik and Karabilgin, 2022). Music not only relieves pain but also creates outcomes such as a decrease in blood pressure and pulse, as well as an increase in the endorphin hormone. A study was carried out to

investigate the influence of music on the post-operative pain level, anxiety, and vital signs of persons after surgery. As a result, it was observed that the pain, anxiety, blood pressure and respiratory rate values of women who listened to music decreased compared to women who did not listen to music (Yüksekol and Başer, 2021). According to another study, it was observed that the level of anxiety was reduced more than oral anesthesia in an environment where music was listened to before the surgery (Demirdağ, 2021).

### **Nutrition education with music**

The effect of providing nutrition instruction accompanied by music was explored in a study conducted in Nigeria. The study assessed the fixed effects of a single independent variable (nutrition education) and two moderator variables (gender and geographic location) on three outcome variables (healthy eating knowledge, attitude, and practice). The study included four secondary schools in Ibadan that were chosen through a multistage sampling technique. Participants in this study got an 8-week (1 hour 20 minutes per week) nutrition education program based on a literature review guideline (Ogunsile, 2021). Nutritional needs of adolescents, the meaning and components of healthy eating, the health benefits of breakfast, the health benefits of fruits and vegetables, the health benefits of calcium, the components of healthy snacks, the harms of too much sweetness, and the harms of sugary drinks were all covered in eight lessons. Participants in the intervention and control groups attended the same classes, but those in the intervention group learned nutrition through songs, while those in the control group learned through standard classroom education. Following the nutrition education, the adolescents' knowledge and attitude were assessed and re-measured.

The healthy eating songs were written using church tunes that the participants were familiar with. Because the church is the most commonly accepted religious group at work, healthy eating songs are made simple to learn. The study's findings indicate that music is an effective supplement to standard classroom instruction. Nutrition education defined by healthy eating songs enhances participants' knowledge, attitudes, and habits concerning healthy eating, according to this study. This research suggests that school-based eating habits accompanied by specifically prepared songs can be an effective technique for communicating nutrition-related messages and improving overall

nutritional status. Music will undoubtedly play a larger role in nutrition instruction in the future. At the same time, it is critical that the music genre chosen is appropriate for the target population to be trained.

### **Treatment of eating disorders with music**

Music therapy has also been used to treat disorders associated with nutrition. Anorexia nervosa and bulimia nervosa are eating disorders associated with human psychology. There is a loss of desire and regret for eating because the person's physical structure is deteriorating. Despite his growing weakness, the patient regards his own body as obese. As a result, the patient intends to reduce weight by engaging in activities such as aerobics and gymnastics. Their thoughts are continuously consumed by eating and growing weight. Despite the fact that his weight loss is threatening his life, the patient refuses to eat. These patients are not eating in public and are hiding the fact that they are eating. Another eating disorder, bulimia nervosa, regrets the worry of gaining weight from what they eat and wants to get rid of it by taking diuretics and defecation-enhancing medicines. Medication should be used initially, followed by psychotherapy for certain disorders (Çoban, 2020).

The goal of music therapy is to first ensure that the person can express himself and to achieve self-control. Following that, the goal is to be able to control his behavior in the group and to exert personal control outside of the group. Participating in-group musical activities, listening to and accompanying them, helps kids to be disciplined and regulate their conduct. The individual overeats because he lacks self-control. Musical activities have been demonstrated to have an auxiliary influence in regaining and managing control consciousness. One of the most essential consequences of these activities is that they boost a person's self-confidence and sensitivity. The music professional who will treat you should be both helpful and motivational. Techniques such as inviting the patient to sing along to a song and play an instrument should be utilized to stimulate her emotions and allow her to express herself.

Because sick people avoid eating for fear of their bodies deteriorating, they relax with music to alleviate this worry. It has been discovered that exercises involving improvisation, particularly with an instrument or voice, are successful. It is concluded that these patients have eating disorders and have experienced psychological trauma. Therefore, the primary issue is that it is

known that the person is created by defects in his parents, intimate environment relationships, and inner world conflicts. These patients are suffering from an unfulfilled and empty emotional emptiness. Patients who try to satisfy their emotional hunger by eating can use music to fill the void.

Because sick people avoid eating for fear of their bodies degrading, they use music to help them relax. It has been discovered that improvisation exercises, particularly with an instrument or voice, are effective. It has been determined that these patients have eating disorders and have suffered from psychological trauma. Therefore, the primary issue is that it is known that flaws in his parents' relationships, intimate environment relationships, and inner world conflicts make the individual. These patients have an unfulfilled and empty emotional emptiness. Patients who try to satisfy their emotional hunger by eating can fill the vacuum with music. It is well recognized that the Neva tone imparts a sensation of taste, flavor, and freshness. Simultaneously, the maqam Neva reduces melancholy. It is sometimes referred to as the heart-caring makam. It is said to chase away evil notions, give strength and heroism, and create heart bliss. It evokes sentiments of bravery and heroism. It can help with the treatment of mental diseases. It is one of the most established offices. It has a therapeutic impact on adolescent girls' gynecological disorders. It literally translates to "voice, tone, maqam, and harmony" (Güvenç, 1976). It is recommended for individuals with mental illnesses since it provides listeners with serenity, solace, and relaxation in two maqams. It has been expected that listening to music in these makams will make patients suffering from eating disorders feel better.

In addition to listening, producing certain rhythms and tempos and being in public places will be beneficial in treating patients. It is also critical that kids do not feel isolated at this moment. As a result, people suffering from eating disorders could encourage their family to learn an instrument, join a chorus, or take private music instruction. It is well known that it will aid in the development of the ability to express oneself, as well as build self-confidence and self-awareness (Çoban, 2020).

The application of music therapy is an inexpensive natural intervention, has no side effects and has an active role in physical, psychological, social, emotional and spiritual healing. Therefore, the application of music therapy

may be preferred in the management of anxiety and fear in patients who will undergo dental treatments.

### **F) Alexander Technique**

Gray addressed the psychological aspect of the technique, defining it as "a proper way of reaction and use, with more confidence and a pleasing feeling" in addition to saying that the Alexander Technique is a form of psychophysical re-education that ensures the correct use of the body by suppressing habitual responses. Furthermore, he provided succinct explanations such as "retraining muscle sensation," "a method of teaching you to react more appropriately," and "a method of getting rid of unnecessary tensions that impede our movements." (Gray, 1999). This approach, developed by Fredrick Matthias Alexander (1869-1995), has aided many persons active in the performing arts. However, this technique is not a therapy or exercise program; rather, it is a strategy based on right muscle use and correcting behaviors that are seated wrongly (Parlar, 2017).

The trainer's first key point in the Alexander technique is to develop the student's emotional awareness in the face of the usual excessive tension in the neck and spine. An individual will considerably lessen this tension by keeping the head area of the body in its natural free balance on the spine, keeping the eyes open but focusing without straining the eyes, relaxing the shoulders and knees, and lengthening and expanding the back area (Aktar, 2016). Figure 3 depicts the Alexander Technique.





**Figure 3.** Alexander Technique

The Alexander Technique is a technique that helps to reduce all bodily tensions by stopping several habitual motions (Tezişçi, 2018). The individual can employ his breath control to the greatest extent possible rather than his comfort and knowledge of his body (Uyar, 2017). The Alexander Technique can help us achieve head-neck-back synchronization (Helvac, 2019). It is a psychophysical approach that retrains movement patterns by releasing undesirable muscular tensions and avoiding muscle habits that cause neck and back discomfort (Özgür, 2019). It is a technique that has emerged to eradicate the effects of incorrect physical motions on the muscles and the person's posture disorder, as well as the discomforts and reasons of this (Sabzehzar, 2020). Following the correct method, comfort and awareness of the body have a favorable influence on stage anxiety (Teztel and Aşkın, 2007). According to studies, violinists who used the Alexander Technique had a favorable influence on their pain and anxiety difficulties (Özmenay, 2018). Wind players who do not have correct posture and supple musculature will experience joint pain and muscle spasms since they must carry the instruments while playing, as a way that helps wind players focus on posture, both physically and emotionally. As

a result, it will hinder proper breathing from being used. According to John Henes, a trumpet musician, even players who normally play their instruments began to play far more comfortably after receiving the Alexander technique (Poyraz, 2022).

Alexander has consistently underlined that how people react to what is happening, that is, how they utilize themselves, is the reason for everything in life. It is claimed that the reason why the Alexander Technique materials, in particular, emphasize on the concept of Psychophysical Unity is that people regard the entirety that composes them as separate. The term 'physiological' generally refers to the body, movement, posture, stretching, and relaxation; the term 'psychological' relates to moods, feelings, thoughts, and feelings; and the term 'metaphysical' refers to energy, metaphors, or spiritual conceptions (Alcantara, 2013).

The Alexander Technique can be utilized by anyone who wishes to improve their posture, not just actors, singers, instrumentalists, and dancers. However, this technique is crucial for artists in terms of expressing their creativity with greater freedom. The following are the author Polatin's explanations for the worldwide popularity of the Alexander technique: "First and foremost, Alexander himself is a theater artist." This technique was developed in response to the demands of his own work. The tale of Alexander's invention of this approach instructs us to be conscious of the quality of our observation and use of our body." (Polatin, 2013).

The Alexander technique was utilized to treat muscle weariness and unwanted behavioral habits in a study on the prevalence of musculoskeletal illnesses, stress, and performance anxiety among musicians. According to research, the Alexander Technique can help patients with performance anxiety, respiratory functioning and posture, and chronic low back pain (Klein et al., 2014).

### **G. Treatment with Colors (Chromotherapy)**

Color therapy (chromotherapy) is the use of color to cure a variety of ailments (Azeemia et al., 2019). Color discoveries date back centuries. Its use, type, and names have expanded and become more common over time. Colors exist in practically every region that our eyes see and do not see. Although the names of the colors vary from language to language, their look is consistent.

Color meanings may differ across cultural structures. Every nation draws attention by combining colors that they feel have symbolic meanings with symbols, so improving the visual impression in temples.

It was widely used in Egypt, Greece, India, and China. Human energy centers are known as chakras. Each color in the body corresponds to a different Chakra. These colors are used to correct energy abnormalities in the chakras, which cause health problems. Colors are sometimes used to identify diseases. While white is perceived as clean, blue and yellow are perceived as bad and dirty (Kılıç and Başol, 2014). Following the selection of the suitable color, the color is transmitted to the body in the form of light, the stone of the selected color can be moved, or meditation can be performed with the selected color (Weaver, 2020). Colors influence people's perceptions of the outside world, as well as their effort, work, struggle, and choice. Without colors, people would not have the culture and civilization they have today (Okcu, 2007).

According to Hittite magic rites, certain colors have specific places. As a result, the type and method of the spell to be cast vary depending on the color of the material. Colors are often derived from yarn and wool, however for sacrificed animals; particular color choices are made (Kılıç and Başol, 2014). In color therapy, the person is typically requested to express himself by combining numerous colors to assist him achieve emotional balance. It has been discovered that persons who utilize the same hue regularly and excessively have more intense emotional reactions, as well as negative sentiments such as inability to concentrate and being easily bothered by their environment (Withrow, 2004). In Table 3, it is stated that the spells are determined by metal specific to the days, and they are in harmony with the planet of that day and the color of that day (Gürgen, 2022).

**Table 3.** Metals, planets and colors compatible with the days

| Days      | Planet  | Metal   | Color               |
|-----------|---------|---------|---------------------|
| Monday    | Moon    | Silver  | White               |
| Tuesday   | Antem   | Iron    | Red                 |
| Wednesday | Mercury | Mercury | Purple              |
| Thursday  | Jupiter | Tin     | Violet color        |
| Friday    | Venus   | Copper  | Turquoise and green |
| Saturday  | Saturn  | Bullet  | Black               |
| Sunday    | Sun     | Gold    | Yellow              |

The eyes are responsible for color perception. Color perception has been shown to awaken various intentions, trigger emotions, and leave diverse consequences in people. It also serves as a link between people and nature (Kaymak et al., 2022). Colors can make objects appear larger or smaller, closer or further away. Light blues, for example, convey a sense of distance, whilst dark blues convey a sense of convergence. Warm hues appear to be more similar to cold colors than bright colors appear to be to duller ones (Holtzschue, 2009).

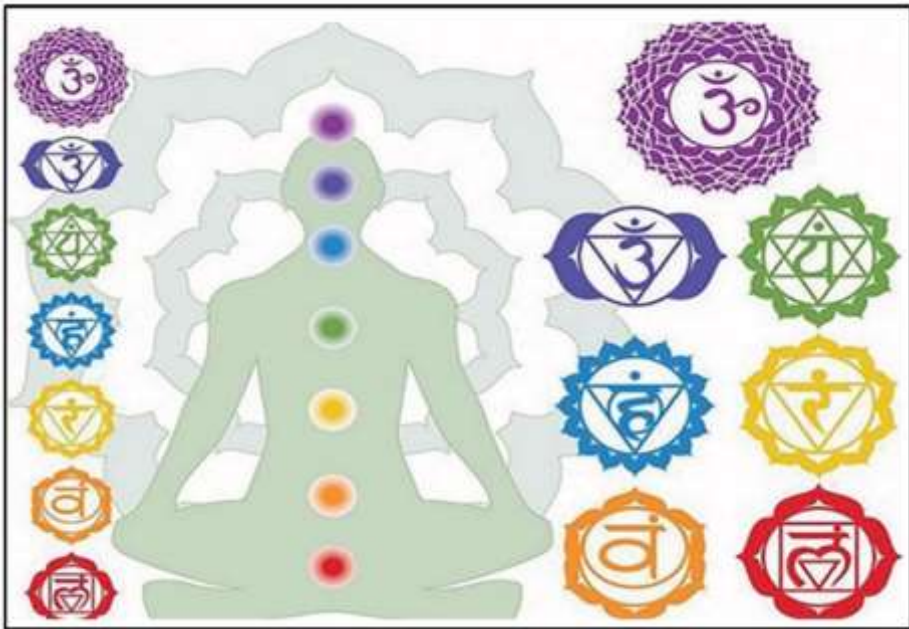
People's emotional states alter instantly when they are exposed to colors (Aktekin et al., 2011). Some colors have been seen to give energy and increase enthusiasm and happiness. As seen in Table 4, the effects and qualities of colors are discussed (Kaymak et al., 2022).

**Table 4.** Effects and properties of colors

| Colors | Effects And Features  |
|--------|---|
|        | 1. It is alive and is the color of passion.   |
| Red    | 2. Gives energy<br>3. It is used in the treatment of sore throat, antipyretic and migraine.   |
| Orange | 1. It is the color of forgiveness and abundance.<br>2. It increases the feelings of power, pleasure, excitement, attachment to life and is used in the treatment of depression.               |
| Yellow | 1. It enables to make correct decisions.<br>2. Used for creativity, harmony, calmness.  |
| Green  | 3. It is a symbol of enthusiasm and hope. It is pain reliever.<br>4. It is the color of reproduction, freshness and renewal.  |
| Blue   | 5. It is the color of faith, tenderness, peace and fidelity.<br>6. It is used as a sedative and has an appetite suppressant effect.<br>7. It lowers blood pressure and makes recovery easier. |
| Purple | 8. It is a symbol of leadership, power and sovereignty.<br>9. It is used as a sedative in the treatment of obsessive-compulsive disorder and fear.  |
| Black  | 10. Expresses concealment and mystery.<br>11. It also has negative meanings such as mourning and despair.   |
| White  | 12. It is a symbol of peace, purity and goodwill.<br>13. It is used in the treatment of hopelessness and depression.<br>14. Expresses the feelings of calmness, relief, innocence.            |

Colors can influence people's views of their surroundings, both positively and negatively. When visual sense in an environment is minimal, negative perception occurs. Negative perception happens when the surface colors are achromatic. Adjectives like monotonous and dull are used to characterize the surroundings. Positive perception occurs, on the other hand, when the colors in an environment are made with distinct color varieties and when color samples of the same color type are employed together at high saturation levels (Manav, 2015). Blue and white colors were employed in the treatment in one study. It has been established that the hue blue causes depression. However, when using light therapy to alleviate seasonal depression, the color blue is used. It has been discovered that bright light treatment, in particular, has the same impact as antidepressant medicines and normalizes sleep patterns (Bal, 2019). Purple symbolizes majesty, dignity, and self-assurance. A color depicts people's inner energy and feelings. Purple is related with people's productivity, clarity of mind, capacity to come up with new ideas, tolerance, and power of thought. It can lead to negative habits such as difficulties concentrating, behaving quickly, and hating waiting. When not employed correctly, it results in an angry, disrespectful, and rude human nature (Ustaoglu, 2007).

At specific locations in the human body, there are energy centers known as "chakras" that have varying frequencies and are linked to the endocrine and neurological systems, circulating and balancing the body's vital energy (Ki) (Chang, 2003). Color therapy research investigations establish links between chakra and color relationships. Each chakra responds to a particular hue. Color correlation with chakras according to this model: Red represents the root chakra. Orange represents the sacral chakra. Yellow represents the solar plexus chakra. Green represents the heart chakra. Blue represents the throat chakra. Navy blue represents the third eye chakra (forehead chakra). Purple represents the Crown Chakra. Figure 4 depicts the positions and colors of the chakras in the human body (Kaymak et al., 2022).



**Figure 4.** The locations and colors of the chakras in the human body

In present day and age, chromotherapy is very commonly employed. It is not scientifically sound. Each color corresponds to a different Chakra in the human body. Chakras are the energy centers of the human body, and their modern medical equivalent is the endocrine system. Human health problems appear to be caused by energy imbalances in the chakras. To cure these energy imbalances, the colors of the respective chakra are applied. For treatment, applications such as sending the appropriate color light to the body, wearing an appropriate color stone, or meditating with the appropriate color are employed (Avery, 2004).

## 5.2. ALTERNATIVE MEDICAL SYSTEMS

### A) Homeopathy

Between 1796 and 1843, the German physician Friedrich Samuel Hahnemann discovered and perfected homeopathy. The researcher, who went on to work as a doctor-chemist-pharmacist and translator, saw that Cullen's *Materia Medica* was translated from English to German in 1790, when he noticed that he treated malaria with cinchona bark (quinine), and this technique

did not make much sense to him. He drank four dirhams of cinchona water twice a day for a few days to understand the actual potency of the medication, and after a while, malaria-like symptoms began to show in his body. Upon obtaining similar results in his trials with other healthy people, he revealed the idea that if the same drug is given to sick people who have similar disease symptoms in healthy people, they can be treated. Homeopathy emerged from this principle (Hahneman, 1849; Kızıl and Atam, 2016).

According to the "Principle of Treating Like with Like," the homeopath provides the most appropriate treatment for the patient in the healthy body, displaying all of the disease's symptoms, by finding the most appropriate dose form. Homeopaths utilize remedies made by homeopathic medicine producers or remedies created in pharmacies using homeopathic pharmacopoeias. There are currently German, British, Indian, American, and French homeopathic pharmacopoeias. The homeopath visits the patient on a regular basis and monitors the healing process until the patient is entirely healed (Başar, 2018).

Homeopathy is an alternative medicine treatment that has been practiced since the 18th century. The fundamental principle of homeopathy is that 'like cures like'. The core premise of homeopathy is that a causal agent can also treat the ailment. This is also considered when creating homeopathic treatments. Plants, animals, minerals, and microorganisms are used to create remedies. The produced homeopathic active ingredient is greatly diluted, and the amount of active component in the solution becomes too low to be detected by any contemporary analysis method today. The use of which homeopathic medicines in the treatment of which signs and symptoms is determined by the symptoms, signs, and features they disclose in healthy people. Homeopathic remedies work within the framework of Avogadro's Law Principles (equal volumes of gases at the same temperature and pressure contain the same number of molecules regardless of type) and retain biological, energetic, emotional, and mental activity even when diluted more than Avogadro's number (Ernst, 2002).

Homeopathy is derived from the Greek terms "hómoios" which means "similar" and "páthos" which means "disease" and means "like disease." Homeopathy takes a comprehensive approach to sickness and healing, with the basic idea of "like heals like" at its core. Homeopathy has its own ideas, methods, products, and practices for diagnosing and treating patients. As a result, in a sick person, very little dosages of any drug that might produce

disease symptoms in a healthy person can eradicate these symptoms and give recovery. Each person reacts differently to the same ailment; homeopathy is based on the premise that "there is no disease, only patients," and treatment is tailored to the individual (Hahnemann, 1833). In the classification of the World Health Organization (WHO), homeopathy is accepted as one of the alternative medicine methods (Sezer, 2015).

Homeopathy is a therapy method based on the principle of similarity and is derived from the Greek terms *HOMOEIO*, which means similar, and *PATHOS*, which means disease. Although Paracelsus and Hippocrates established this theory, Hahnemann systematized it and detailed its principles in his book *Organon*. The first of these principles is to avoid causing harm to the patient during both diagnosis and therapy. The patient's mental, spiritual, and bodily history is utilised in homeopathy. As a result, homeopathy is a comprehensive therapy method. Homeopathy is particularly useful for issues that are not recognized as diseases by chronic, psychological, or modern medicine, or for which there is no solution. The aim in homeopathy is to increase the self-healing power of the body by loading the energy it needs (Sahani, 2007).

The substances used in homeopathy are plant (such as belladonna, calendula, arnica), animal (such as snake, bee, dog milk, pus, blood, cartilage tissue, umbilical cord, whole embryo, diseased tissue), mineral (gold, arsenic, zinc, phosphorus, calcium) as well as acid (such as sulfuric acid, ascorbic acid), salt (such as sodium salts, calcium salts, magnesium salts, potassium salts), enzymes (such as coenzyme A) and synthetic properties. Rabid dog saliva, vaccinations, scabies, and tuberculin are all examples of chemicals that can be caused by malignant forms. Fresh or dried raw materials of plant or animal origin are preferred. It is important to take precautions to keep the plant as natural as possible (Vannier, 1976; Kaya et al., 2000).

The reference source for homeopathic medicine, "*Materia Medica*," discusses the origins, qualities, and application of medications used in treatment. During the Hahnemann period, he worked on approximately 100 homeopathic treatments. Homeopaths have continued these medicinal trials (proving) in many parts of the world, and the number of these drugs has now surpassed 3000 (Başar, 2018). Homeopathic medications are well known for their ability to promote physical and emotional health, increase well-being,



prolong life, reduce fatigue, strengthen the body's natural defenses, and raise tolerance to treatments such as chemotherapy (Danno et al., 2016). Homeopathy is the cure of a disease-causing substance when given at a high dose to a healthy person, by administering a very low dose to a patient with similar symptoms. When used in accordance with its principles, homeopathy is a natural, side-free and holistic healing method (Ernst, 2002).

Homeopathy's pharmacy differs due to its holistic approach and philosophy. To mobilize the vital force, the smallest dose of the most similar medicine is used in the treatment. Dynamization is used to achieve the lowest possible dose. The dynamic energy of the components develops when pharmacological ingredients are split into microscopic parts. It is conceivable to eliminate the disease with dynamic energy that is only slightly bigger than the disease force they must cure. Homeopathy's vital force notion, which has a philosophical foundation, is not found in any other medicinal method. The principle of dynamism underpins homeopathy in pharmacy. Homeopathic medicines are prepared by going through a process called dynamization or potentiation of raw materials. Thus, the unique information contained in each substance reveals the potential of that substance and turns into a homeopathic medicine (Owen, 2007)

The patient's mental, spiritual, and bodily history is utilised in homeopathy. As a result, homeopathy is a comprehensive therapy method. Homeopathy is particularly useful for issues that are not recognized as diseases by chronic, psychological, or modern medicine, or for which there is no solution. The goal of homeopathy is to boost the body's self-healing power by filling it with the energy it requires (Sahani, 2007). Homeopathy attempts to address the source of the problem that causes the illness condition by focusing on the patient/client's personality qualities, behaviors, and many other similar elements. While doing this, it uses the symptoms that already exist in the person. Unlike traditional medicine, it employs healing methods by stimulating the patient's life force to address the origins of the symptoms rather than attempting to eliminate them (Sezer, 2015).

Witt et al. (2005), the most common complaints of the patients in the study conducted by Germany and Switzerland, which examined approximately 4,000 patients who received homeopathic treatment using the prospective cohort method, were allergic rhinitis in men, headache in women, and atopic

dermatitis in children. The severity of the disease was significantly reduced 24 months after the initiation of homeopathic treatment. Significant improvements in patient quality of life have also been recorded. Itamura, in his research examining the effect of homeopathic treatment in chronic skin diseases; states that the majority of patients (88.3%) have at least half of their complaints about chronic skin diseases reduced after homeopathic treatment (Itamura et al., 2007).

Nosodes are homeopathic treatments that, among other holistic alternatives, replace immunization. Immune modulators derived from disease products are known as nosodes. Preventive treatment with homeopathic nosodes is successful. It lowered the occurrence of canine distemper. The most common pet diseases that benefit from nosodes include kennel cough, feline flu, feline AIDS, and feline leukemia. Furthermore, homeopathic remedies are frequently utilized to alleviate side effects following immunization (Saxton, 1991).

Muscari-Tomaiolive et al. (2001) investigated the quality of life of headache patients before and after homeopathic treatment. Following homeopathic treatment, statistically significant improvements were reported in all quality of life aspects. It has also been observed that after homeopathic treatment, more than 60% of cases reported a reduction in headache.

Homeopathy is now only taught as a course in university pharmacy faculties. The fact that there is a discrete field of specialization in medical faculties, on the other hand, will be a significant element in the spread of homeopathy. Following that, including homeopathic treatment into the family medicine-health center system will boost people's ability to restore health more affordably, ultimately contributing to the country's economy. It is recommended that information about homeopathy be provided to both health professionals and the public, that results of homeopathy studies be shared through social media, that educational activities be organized, and that scientific research on the subject be conducted.

## **B) Naturopathy**

This understanding is based on the idea of natural nutrition, sufficient sports and appropriate rest, an average lifestyle that is neither too active nor stagnant, having constructive and creative ideas, protection from harmful

environmental factors, and making it all sustainable (Dawn and Pal, 2011; Nair and Nanda, 2014). A therapy method is based on the premise that the organism has the potential to sustain health and heal itself. Its goal is to employ the body's natural healing potential to eliminate diseases and enhance individuals rather than invasive treatments and the use of artificial medications (Dunne et al., 2005). It is founded on the concept that the body has the potential to heal itself. Diseases, according to naturopathic physicians, are the result of not taking the natural norms of life seriously or acting against them. Recovery is supposed to be possible by methods such as eating natural, unrefined, organic foods, getting enough exercise and rest, leading a relatively regular life, thinking constructively and creatively, and avoiding environmental contaminants (Murray and Pizzorno, 1999; Doğan et al., 2012).

The belief in naturopathy that if the groundwork is laid for the human body to heal itself, it can heal itself without the use of other medical medications. One of the main causes driving the spread of naturopathy understanding in India is the fasting and exercise lifestyle that Mahatma Gandhi, the emblem of the Indian liberation movement, embraced by integrating the philosophy of yoga and naturopathy (Ghosh, 2018).

People may choose these treatments, which have been used for many years, due to their ease of use, accessibility, and cost-effectiveness. As a result, scientific infrastructure and legal rules are required to support these practices. GETAT applications will become more popular in our country as the degree of proof in the studies increases.

### **C) Manipulation (Tui-na)**

Chiropractic or complementary and alternative medicine (CAM) applications are the most widely employed to control chronic diseases and risk factors (overweight 38.2%; obesity 21.4%; high cholesterol 19.6%; hypertension 18.1%; smoking 17.4%; alcohol intake 6.8%; diabetes 9.1%). osteopathy, massage, acupuncture, and naturopathy (Hawk et al., 2012; Uysal, 2016). Osteopathic mobilization and manipulation applications have recently gained attention in scientific circles due to their success in correcting short extremities, pelvic distortion, and spinal curvatures (Aydin, 2015). Chiropractic manipulation is a type of manual therapy. This method relies on applying pressure to the spine and joints to alter the neurological system and natural

defense mechanisms in order to treat pain and promote health. Chiropractic is generally used to treat connective tissues and musculoskeletal problems that affect muscles, tendons, joints, cartilage, bones, and ligaments (Köksoy, 2008; Bulduklu, 2015)

#### **D) Ayurveda**

The most ancient yet current traditions are Ayurveda, traditional Indian medicine (TIM), and traditional Chinese medicine (TCM). These are the two great traditions, both of which have solid intellectual, experiential, and experimental foundations. Some of the reasons for rising public interest in complementary and alternative treatments include increased side effects, a lack of curative treatment for some chronic conditions, the high cost of new pharmaceuticals, microbial resistance, and emerging diseases (Humber, 2002; Patwardhan et al., 2005). Ayurvedic practices are designed to counteract the ravages of time, enhance the body's defense system, and help people live long, healthy lives (Ceyhan and Yiğit, 2016).

It is one of the earliest known methods of healing. It is renowned as the "Mother of All Healings" and originated in India (Yılmaz et al., 2022). Ayurvedic Medicine can be seen of as practices for people's bodily and mental well-being. There are ways of treatment that involve preparing various types of treatments from natural materials, with goals such as improving one's lifestyle and lowering pain (Kaya and Yılmaz, 2020). Nature is made up of five components, according to Ayurvedic Medicine. These are the elements air, water, fire, earth, and space. Humans, like everything else in the universe, are composed of these elements. As a result, nature and man have a tight relationship (Çiftçi et al., 2020).

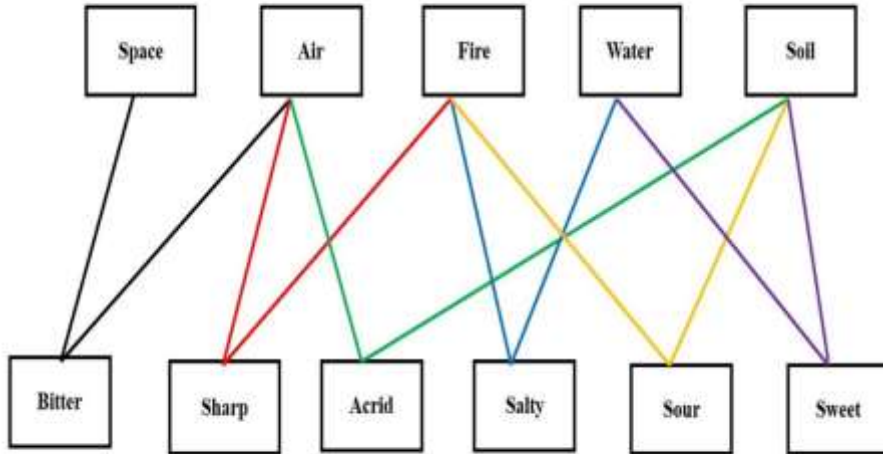
Everyone has a distinct fingerprint and energy, as well as a unique combination of physical, mental, and emotional attributes. However, both internal and external forces influence this equilibrium and cause it to shift. Seasonal changes, physical trauma, workplace activity, and family relationships all have an impact on the balance by producing physical and mental stress. Unbalance is disorder; balance is natural order. According to Ayurvedic philosophy, health is order, and disease is bodily disorder (Yılmaz et al., 2022). According to Ayurvedic Medicine, the human body is classified into three categories. Each body type requires a different diet and workout

regimen. According to Ayurveda, everyone has a distinct body type, known as dosha, from the moment they are born (Gezen and Skilled, 2019). Vata, Pitta, and Kapha are bodily structures formed by doshas. Space and air offer Vata balance, fire and water provide Pitta balance, and earth and water provide Kapha balance. When assessing a patient in Ayurveda, the physician considers ten factors. Psychosomatic structure, disease susceptibility, tissue quality, bodily development, anthropometry, adaptability, mental health, digestive strength, exercise endurance, and patient age are all characteristics of the patient. Ayurvedic treatment is frequently based on herbal techniques (Ravishankar and Shukla, 2007). Body structures of dosha kinds are shown in Table 5 (Keskin et al., 2015). Ayurveda also employs a variety of items (herbs) and procedures (such as food, massage, lifestyle changes, Yoga, and exercise) to cleanse and regenerate the body (Görücü, 2018).

**Table 5.** Body Structures of Doshas

| Vata Body Structure | Kapha Body Structure    | Pitta Body Structure |
|---------------------|-------------------------|----------------------|
| Weak Body           | Thick or Flattened Body | Athletic body        |
| Knee                | Wide Ear, eye, lip      | Straight hair        |
| Curly hair          | Big Teeth               | Prominent Eye        |
| Tall Length         | Short Blunt Fingers     | Vivid Skin Color     |
| Thin Fingers        | Thick-Wavy Hair         |                      |
| Pale Skin           | Thick-Hard Leather      |                      |
| Crooked Tooth       | Thick-Hard Nail         |                      |

Six tastes influence doshas. These flavors are sweet, bitter, sour, salty, bitter, sharp, and bitter. People with Vata body types should eat sweet, sour, and salty foods. People with Pitta body types should eat sweet, bitter, and astringent foods. Finally, those with a Kapha body type can eat caustic, harsh, and bitter meals. Figure 5 depicts the relationship between tastes and Ayurvedic components (Haspolat and Ertuğrul, 2022).



**Figure 5.** Relationship of tastes with elements in Ayurveda

Table 6 also shows the link of flavors and components to doshas (Haspolat and Erturul, 2022). According to Ayurveda, the universe is made up of five elemental combinations (pancha mahabhutas). Akasha (ether), vayu (air), teja (fire), aap (water), and prithvi (earth) are the five elements. The five elements can be found in all scales of life and in both biological and inorganic substances in the material universe. Elements in forces biological systems, such as humans, are programmed into three groups that govern all life activities. These three forces (kapha, pitta, and vata) are referred to as the three doshas or tridosha. Each dosha is made up of one or two elements such as space and air. Pitta of fire, and kapha of water and earth. Vata dosha has the mobility and quickness of space and air; pitta dosha the metabolic qualities of fire; kapha dosha the stability and solidity of water and earth. The tridosha regulates every physiological and psychological process in the living organism. The interplay among them determines the qualities and conditions of the individual. A harmonious state of the three doshas creates balance and health; an imbalance,

which might be an excess (vridhhi) or deficiency (kshaya), manifests as a sign or symptom of disease (Lad, 1985; Hankey, 2005).

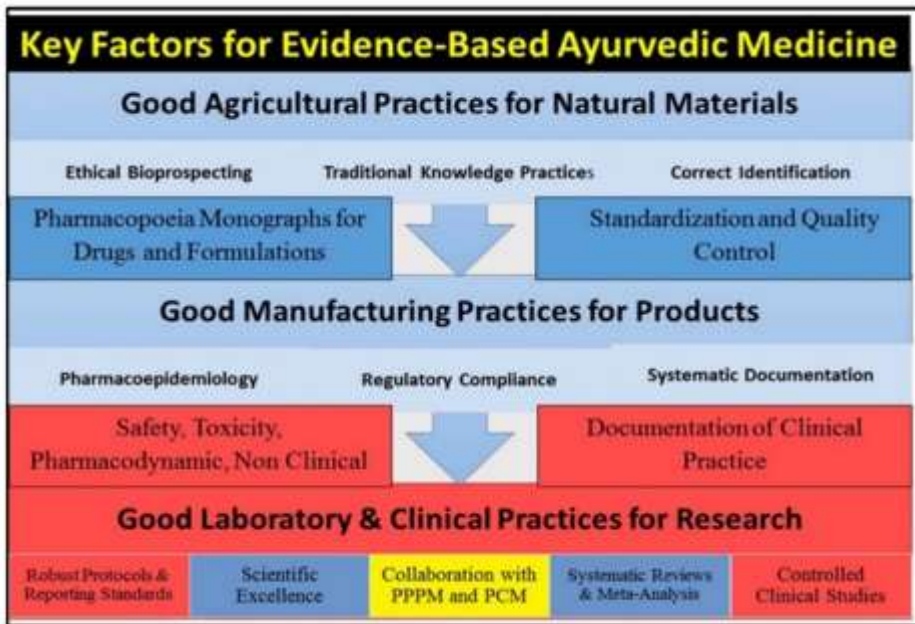
**Table 6.** Relationship of doshas with elements and flavors

| Taste  | Element    | Sample Foods                                    | Vata | Pitta | Kapha |
|--------|------------|---|------|-------|-------|
| Sweet  | Soil-Water | Wheat, Rice, Barley,<br>Dairy products          | +    | +     | ↓     |
| Salty  | Fire-Water | Sea Salt, Salt, Chips,<br>Pickles               | +    | ↓     | ↓     |
| Minus  | Fire-Earth | Lemon, Orange,<br>Cherry, Vinegar               | +    | ↓     | ↓     |
| Sharp  | Air-Fire   | Black pepper, cloves,<br>thyme, onion           | ↓    | ↓     | +     |
| Acrid  | Air-Earth  | Cress, Arugula,<br>Radish, Turmeric             | ↓    | +     | +     |
| Bitter | Space-Air  | Coffee, Chard,<br>Broccoli, Walnuts,<br>Legumes | ↓    | +     | +     |

Ayurvedic nutrition is the foundation of life. People eat at least three times every day on average, thus the foods they consume have a direct impact on their health. Foods can be both a source of health and healing and a source of disease (Ağgön et al., 2021). Instead of focusing on fat and protein sources, Ayurvedic CHO considers how the flavor and texture of foods affect the doshas. Doshas are the root causes of illness and disease. If the doshas rise, it indicates illness, but if they are balanced, it indicates health. According to Kessler et al. (2015), during 12 weeks, half of the patients with knee osteoarthritis were treated with Ayurvedic therapy and the other half with conventional medicine. When pain, stiffness, and physical functioning were assessed using the knee index in the Ayurvedic Medicine group, statistically significant results were achieved. (Sönmez, 2018). Furthermore, Ayurvedic Medicine is one of the strategies used to treat sleep disturbances (Şen et al., 2020). Healing is made in Ayurvedic Medicine in India by employing the gummirezi (tree portion) of *Boswellia Serrata* (Indian Daily Tree) in the treatment of inflammatory

illnesses. It has been discovered that a portion of this tree, which is known to be indigenous to India, has been employed for hundreds of years in many geographies to treat various chronic inflammatory disorders (Özüpek et al., 2023). Ayurvedic applications include the use of honey in the development of functional food products; it is also used in bakery products, confectionery, and dairy products (Pehlivan, 2023).

The Ayurvedic industry must identify and address the critical demand for scientific evidence (Patwardhan, 2013). Systematic documentation, suitable methodology, and rigorous experimentation in accordance with best practices, combined with epistemologically sensitive approaches, will be critical in moving Ayurveda closer to evidence-based practice. Figure 6 depicts key aspects critical for Ayurveda to develop toward evidence-based scientific approaches related to drug and practice quality (Patwardhan, 2014).



**Figure 6.** Key factors for evidence-based Ayurvedic medicine

Ayurveda is not simply a WMS, but it also integrates eclectic living philosophies that have contributed to the development of complex theories about health and disease over more than three millennia, including philosophical, epistemological, and spiritual components. Ayurveda, for



example, proposes a paradigmatic harmony of physiological, psychological, social, and environmental aspects in the human microcosm and the universal macrocosm (Engler, 2003; Das, 2011; Kessler et al., 2013).

Chemical investigation of various Ayurvedic antiarthritic medications revealed the presence of synthetic anti-inflammatory pharmaceuticals such as phenylbutazone, indomethacin, and/or corticosteroids (Farnsworth, 1993). Numerous medications have entered the international market because of ethnopharmacology and traditional medicine research. The advancement of genomics and proteomics has opened up new avenues for therapies and medication discovery and development. A better understanding of the human genome has aided in the scientific understanding of individual variance. Despite the fact that drug targets have transformed over the last decade, the industry remains target-rich and lead-poor, caught in the old mindset and strategy.

Ayurveda is a system of treatment or medicine, not just a method of treatment. As a result, while comparing GETAT applications, it is impossible to discuss similarities with only one application. The natural treatments and practices that underpin Ayurvedic remedies, on the other hand, are similar to GETAT methods such as mesotherapy, acupuncture, phytotherapy, and chiropractic.

### **E) Apitherapy**

Apitherapy application is one of the GETAT procedures that has been widely used for ages in many different societies and cultures. Although these applications have been in use for many years, interest in apitherapy has grown in recent years due to the development of GETAT apps. Although these applications are extremely valuable, they must be used with considerable knowledge and competence. Apitherapy is a therapeutic procedure used to safeguard people's health, prevent sickness, or treat disease (Arslan and Sevgi, 2019). Api is short for Apis bee. Apitherapy is a type of therapy that uses bees and bee products. Honey, beeswax, propolis, pollen, royal jelly and bee venom products, which are apitherapy honey bee products, are used medicinally. Although there is no definite information about the first use of apitherapy, it is generally used in ancient Egyptian, Greek and Chinese medicine according to ancient written works (Bose and Acharya, 2015). It is the therapeutic use of bee

products to prevent diseases or to treat existing disease. The word "api" in apitherapy comes from the Latin scientific name of the honey bee, "Apismellifera" (Nitecka-Buchta et al., 2014). Apitherapy, which has been used for over 6,000 years, is also mentioned in ancient Egyptian medical texts. Furthermore, the Greeks and Romans (Hellner et al., 2008) employed bee products for therapeutic purposes.

Many different cultures have employed bee products throughout history. All ancient writings, including those from Greece and Rome, mention honey and pollen as sources of youth and health. A mixture of honey and pollen is said to be used as a plaster on wounds in the east for health tonic reasons. It has been reported that honey tonics are utilized to keep youth in India. There is a widespread assumption that a diet rich in honey and milk increased lifespan in the past (Gould James, 2004).

Apitherapy contraindications: It is not recommended for youngsters or anyone who are allergic to bees or bee products. Individuals under the age of 18 should not be exposed to bee venom. Bee products should not be used on newborns under the age of one, according to experts. Bee venom; it should not be used in persons with heart failure, respiratory distress, local infections in their bodies, people with liver function problems, people using cardiac medication, and pregnant and nursing women (Anonymous, 2023g). Apitherapy products with a wide range of indications are commonly used to treat a variety of systemic ailments as well as some dermatological issues. Furthermore, numerous studies have been conducted to investigate the antibacterial, antifungal, antiviral, antioxidant, anticarcinogenic, anti-inflammatory, antidiabetic, and immunomodulatory effects of these products in vitro and in vivo (Komosinska-Vassev et al., 2015; Sorgucu, 2019). While in vitro data is valuable, the evidence value is minimal when it is not backed by clinical research.

## **F) Bee Products**

Because of their great medicinal capabilities and rich bioactive components, bee products including as honey, propolis, pollen, royal jelly, and bee venom have been widely employed in folk medicine from ancient times (Sral, 2021). In scientific research, bee products have been shown to have antioxidant, antibacterial, anti-inflammatory, antitumoral, antiviral, and other

properties (Bartkiene et al., 2020). Bee goods include honey, bee venom, pollen, propolis, royal jelly, and bee bread (Parlakpınar and Polat, 2020).

## **1. Honey**

Honey is the world's most well-known sweet bee product, formed from nectar secreted from nectar glands in flowering plants and substances secreted by insects living on the plant, as well as the storage and maturation of these substances in the bodies of honey bees (*Apis mellifera*) (Anonymous, 2023h). It was used to treat a variety of ailments in Egypt, Sumer, and other places such as Ancient Greece. It is a non-artificial food that is responsible for numerous phytobiological activities ranging from wound healing to upper respiratory tract infections, from aging to cancer prevention, and its importance is growing by the day (Ulusoy, 2012).

Honey contains approximately 200 different types of components and is a functional food that is easy to digest, nutritious, and protective against many diseases due to the nutritional elements (vitamins, minerals, organic acids, flavonoids, phenolic acids, amino acids, and enzymes) it contains (Mutlu et al., 2021). Honey also contains nitrogen from amino acids, vitamins, minerals, acids, and enzymes. The nitrogen content of honey ranges between 0.04 and 0.1%. It also has a high concentration of amino acids, which are essential and must be consumed with food. However, the amount of free amino acids in honey is quite low, with only eleven of the 21 amino acids present. The most important are isoleucine, which is the most frequent, and proline, which is the most dominant. (Carratù et al., 2008).

It possesses antibacterial, antiviral, anti-inflammatory, antioxidant, and prebiotic properties. It is known to prevent infection, digestive system, cardiovascular, skin, oncological disorders, and a variety of other health problems, as well as to aid in the healing process (Acar, 2021). Honey is also a mineral-rich food. Many scientists have reported the following minerals in honey: potassium (K), chlorine (Cl), sulfur (S), calcium (Ca), sodium (Na), phosphorus (P), magnesium (Mg), silicon (Si), iron (Fe), manganese (Mn), and copper (Cu) (Bogdanov et al., 2008). Honey is a bee product that, in addition to being a meal, can be utilized for therapeutic purposes. Table 7 depicts the apitherapy effects of several honey kinds (Ekici and Gölgeli, 2021).

**Table 7.** Types of honey used in apitherapy and their effects

| Types of Honey   | Caused Effects                                |
|------------------|---|
| Mint Honey       | Relieves digestion                            |
| Flower honey     | Boosts immunity, relaxes the digestive system |
| Pine honey       | Relieves breathing and is diuretic            |
| Chestnut Honey   | Regulates hypertension                        |
| Orange Honey     | It is calming and relieves cramps             |
| Linden Honey     | It is calming and good for insomnia.          |
| Red clover honey | Prevents diarrhea, increases edema            |
| Eucalyptus honey | Positive effects on the respiratory system    |

Honey is an important part of human nutrition since it improves digestion, absorption, and utilization of nutrients (Akalm, 2010). The suggested daily dose of honey for adults and children is 0.8-1.2 grams per kilogram, and honey should be drunk every day for 1.5-2 months to see the impact (Özkan and Bancar, 2015). Honey's impacts and benefits on people's health are being validated as a consequence of daily research, and its apitherapeutic value is growing (Ulusoy, 2012). Honey contains roughly 25 different types of oligosaccharides (disaccharides, trisaccharides, and tetrasaccharides), primarily glucose and fructose (Anklam, 1998; Bogdanov, 2002; Kartal, 2012).

The flavonoid concentration of honey shows the botanical origin of the honey. *Citrus* flower of honey rich in hesperitin (flavanone) (*Citrus* spp.); Rosemary flower (*Rosmarinus officinalis*), rich in 8-methoxy campherol (flavonol); honey lavender flower (*Lavandula* sp.), rich in luteolin or naringenin; sunflower (*Helianthus annuus*) rich in quercetin (flavonol) (Yeşilada, 2015).

Pine honey, thyme honey, lavender honey, chestnut honey, flower honey, citrus honey, orange honey, anzer honey, purée honey, cedar honey, clover honey, avocado honey, linden honey, blueberry honey, buckwheat honey, eucalyptus honey, sage honey is among the honeys recognized across the world.

Honey's antibacterial effect is assumed to be due to its osmotic environment, which is caused by its high sugar content. Bacterial growth is inhibited by honey's high osmolarity. Sugar molecules attach to water, causing bacteria to lose water. Honey's osmolarity is effective in controlling infected

wounds and in accelerating infected wound healing (Chirife et al., 1983). Honey has been shown to protect the damaged area from various infections, particularly in wounds and burns, due to its broad-spectrum effect on microorganisms that cause infections (Dixon, 2003), and to heal wounds by boosting local cytokine production (Tonks et al., 2003).

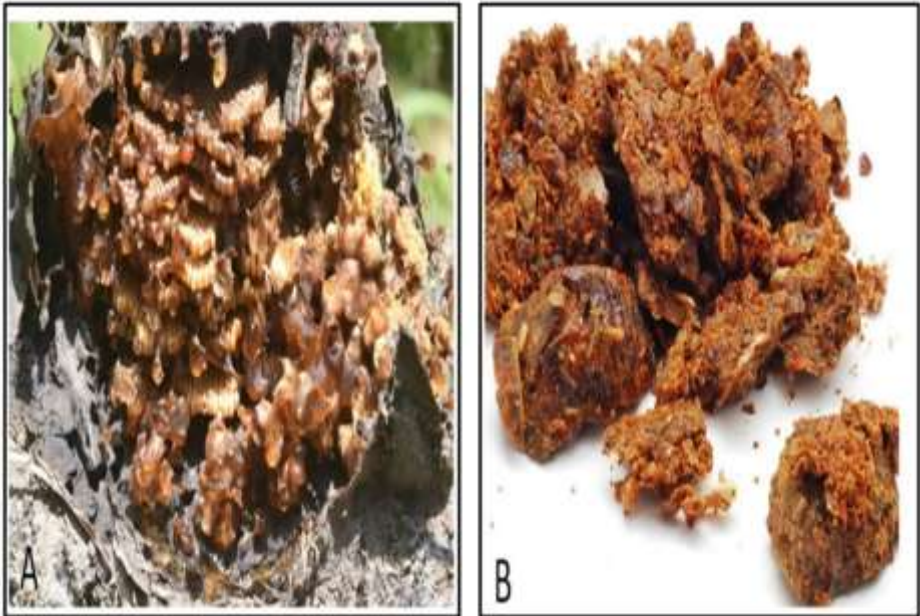
Honey is a remarkable food that bees provide for human consumption. With the advancement of analytical tools, the chemistry and composition of honey and other bee products, which have been consumed as a natural nourishment for thousands of years, may be understood in detail.

## **2. Propolis**

Propolis is a resinous, sticky material collected by honey bees from the bud, bark, or core sections of plants. The Greek words "pro" and "polis" are combined to form the word propolis. Propolis, formed from the terms "Pro" in the sense of defense and "polis" in the sense of city, refers to the protection of the hive, which is envisioned as a city of bees (Ghisalberti, 1979). Propolis is a resinous substance formed by worker bees by biochemically modifying the resinous substances and plant secretions that they collect in the pollen baskets of their hind legs from tree bark, sprouts, branches, and buds of plants, with enzymes secreted from glands in their heads, and by mixing a little bit of this resinous substance with a little bit of wax this resinous substance (Bankova et al., 2000). Honey bees utilize propolis to close hive holes and fissures, reinforce the thin walls of the honeycomb, sterilize the hive, hide invading organisms and foreign objects entering the hive, and prevent putrefaction. Because it is sticky, it is also known as bee glue. Bees utilize propolis to maintain an internal temperature of 35°C by repairing the hive and disinfecting the dwelling area. Figure 7 depicts the propolis that honey bees transport to the hive on their rear legs, while Figure 8 depicts the shape and uncooked form of propolis in nature (Kıllavi and Koçyiğit, 2023). Honey bees use their jaws to extract resin from plants, wet it in their mouths to soften it, and then transport it to the hive via a pollen basket on their hind legs. Propolis is also known as "bee glue" due to its sticky nature (Castaldo and Capasso, 2002).



**Figure 7.** The propolis that the bee carries to the hive on its hind leg



**Figure 8.** (A) Propolis in Nature; (B) Raw Propolis

More than 300 chemicals were found in the propolis content because of the research, including phenolic compounds, aromatic acids, essential oils, wax, and amino acids. Propolis bioactivity is mostly based on flavonoids and hydroxynamic acid derivatives of phenolic chemicals (Anjum et al., 2019). It contains the vitamins thiamine, riboflavin, ascorbic acid, and -tocopherol; copper, calcium, strontium minerals, and components such as caffeic acid, cinnamic acid, and myristic acid (Mutlu et al., 2017). Polyphenols, fatty acids, coumarins, -steroids, steroids, alcohols, terpenes, sesquiterpenes, flavonoids (flavones, flavonones, flavonols, dihydroflavonols, chalcones), stilbenes, amino acids, and over 300 inorganic chemicals Ingredient is present (Omene et al., 2003; Huang et al., 2014). In general, half of raw propolis is resin, with the rest being beeswax and, to a lesser amount, aromatic oils, pollen, and other organic debris (Burdock, 1998).

When retrieved from the hive, the color of propolis, which is sticky and has a distinct fragrance, varies from yellow to dark brown according on the plant species, source, and age. Propolis' color, odor, and therapeutic properties vary depending on the plant, region, season, and colony (Karabulut, 2011).

Propolis is a resinous material generated by honey bees to protect themselves from invaders. It possesses medicinal characteristics that have been used since antiquity (Miguel and Antunes, 2011).

Bees use propolis to repair holes in honeycombs, smooth the hive's inner walls, and defend the entrance from intruders. If honey bees cannot obtain sufficient supplies, they may bring dangerous compounds to the colony. As a result, raw propolis must go through several purifying processes before being consumed. When propolis is purified, it provides a possible source of bioactive chemicals responsible for its antioxidant capacity. Total phenolic content and antioxidant capacity of the extracts; the extraction and purification process utilized influences solvent concentration, solid solvent ratio, and extraction time (Cavalaro et al., 2019). Propolis, which is extremely important in bee health and colony protection against all infections, is a vital natural component for human health. Propolis, which has been used by humans for thousands of years to cure a variety of maladies, has also piqued the interest of scientists, and clinical trials have demonstrated its antioxidant, anti-inflammatory, and anti-cancer properties (Memmedov et al., 2018).

Propolis has been shown in research to prevent metastasis by having a high cytotoxic effect on cancer cell types and to provide autophagy via intracellular mechanisms. Furthermore, it has been discovered that it shields healthy cells from the detrimental effects of chemotherapy and radiotherapy used in cancer treatment. It has been claimed that taking propolis at regular intervals will help prevent cancer rather than cure it (Sforcin and Bankova, 2011). Propolis contains antibacterial, antifungal, and antioxidant properties (Doğan and Hayaloğlu, 2012). Propolis was shown to be efficacious exclusively against Gram (+) bacteria and certain fungi in some tests on its antibacterial action (Marcucci, 1995), while it was weak against Gram (-) bacteria in others (Dobrowolski et al., 1991). Table 8 shows the influence of propolis on microorganism groups (Albayrak and Albayrak, 2008; Azize and Gümüş, 2017). Propolis has been shown to have a synergistic impact by boosting the effect of antibiotics in the medium and extending their duration of action in vitro (Hepşen et al., 1996).

**Table 8.** Antimicrobial effect of propolis against microorganisms

| Antimicrobial Effect | Target Organism   |
|----------------------|---|
|                      | <i>Bacillus</i> larvae                                  |
|                      | <i>Bacillus subtilis</i> et al.                         |
|                      | <i>Staphylococcus</i> species                           |
|                      | <i>Staphylococcus aureus</i>                            |
|                      | <i>Streptococcus</i>                                    |
| Bactericidal Effect  | Streptomyces  |
|                      | <i>Saccharomyces cerevisiae</i>                         |
|                      | <i>Escherichia coli</i>                                 |
|                      | <i>Salmonella</i> and <i>Shigella</i> anaerobic strains |
|                      | <i>Klebsiella pneumoniae</i>                            |
|                      | <i>Candida albicans</i>                                 |
|                      | <i>Aspergillus niger</i>                                |
| Fungicide Effect     | <i>Botrytis cinerea</i>                                 |
|                      | <i>Ascospaera apis</i>                                  |
|                      | Plasmopara vitico                                       |
|                      | Herpes  |
| Antiviral Effect     | Potato virus  |
|                      | Influenza   |
| Nematocidal Effect   | <i>Ascaris suum</i>                                     |



Propolis is a bee product that has been known and used for many years and is increasing in popularity today.

### **3. Polen**

Pollen plants and flowers are the male gametophytes that fertilize plants. Bees carry pollen to the hives to nourish their young, and it is a valuable food supplied to people on this occasion (Bayrak, 2005). Pollen is frequently referred to be "one of the world's best food crops." It is a product that contains beneficial ingredients such as vital amino acids, phenolic compounds, vitamins, and pigments (chlorophyll and carotenoids) that can work as potent antioxidants (Kieliszek et al., 2018). Pollen is the only natural protein source for honey bees (Cımbırtoğlu et al., 2019). Pollen contains 22.7% protein, with 10.4% being essential amino acids (methionine, lysine, threonine, histidine, leucine, isoleucine, valine, phenylalanine, and tryptophan). Bee pollen contains flavonoids and phenolic compounds as well as proteins in its structure. Flavonoids have antioxidant, anti-inflammatory and antiatherosclerotic properties (Özdemir et al., 2021). Pollen contains protein, carbohydrates, lipids, enzymes, vitamins, minerals, and bioactive components such as adrenaline and noradrenaline (Karadal and Yıldırım, 2012). Proteins account for approximately 40% of its content (Sorucu et al., 2019). Bee pollen is an excellent immune stimulant and health booster. It is also used as an important food supplement (Komosinska-Vassev et al., 2015). It is antibacterial, antifungal, antioxidant, and anticancer. Pollen in the digestive system; Positive therapeutic results in the treatment of chronic colitis, ulcers, gastric hemorrhage, diarrhea, and constipation, anemia treatment, and cholesterol control (Onbaşı, 2019). Pollen has been regarded as "a miracle drug for rejuvenation and healing" in Chinese and Egyptian civilizations, as well as "life-giving powder" in Roman and Greek civilizations. Another historical observation about the utilization of pollen is that Bedouins employed the gonatotrophic hormone contained in palm pollen to treat infertility (Yeşilada, 2015).

Pollen is being developed as a functional component to improve product quality attributes, in addition to its nutritional and medicinal capabilities (Bakkaloğlu, 2021). Mironova et al. (2020) created a new formulation for milk ice cream by including bee pollen and propolis. The optimal enrichment

concentration was found to be 1% from bee pollen and 6% from propolis, indicating that it had no effect on both physicochemistry and sensory values (Nakilcioğlu and Nurko, 2022).

Bee pollen, a combination of flower pollen and bee secretion, is one of the primary food sources needed for colony expansion. Bee pollen has a carbohydrate content of 15-55%, a protein content of 10-40%, a fiber content of 0-20%, and a lipid content of 1-10%. This percentage changes depending on the plant's origin. Essential amino acids make up almost 50% of the proteins in bee pollen. It is high in phenolic compounds (flavonoids and phenolic acid), vitamins, and pigments (chlorophyll and carotenoids) with excellent antioxidant properties, in addition to important amino acids. Bee pollen contains a variety of vitamins and minerals, as well as carotenoids and terpenes in its structure. Bee pollen is an important functional food because of these qualities. As previously stated, pollen plays an essential role in apitherapy applications due to its medicinal and disease-prevention capabilities (Kieliszek et al., 2018).

In terms of nutritional composition, the drying and storage conditions of pollen that is sought to be given for human consumption in the industrial sense are as significant as its collection. While it was previously understood that the pollen to be dried was dried in the sun, it was discovered that this drying method produced a loss in the nutritious content of the pollen, and the method was discontinued (Aydın, 2016). Because of its essential components, bee pollen is commonly used as a nutritional supplement. With current research, bee pollen is being developed not only as a food supplement with nutritional and medicinal benefits, but also as a functional element to improve product performance.

#### **4. Royal Jelly**

Royal jelly, often known as "Royal Jelly," is secreted from the upper jaw (mandibular) and throat glands (hypopharyngeal) of 5-15 day old worker bees. During their first three days, all bee larvae are fed exclusively royal jelly, and the larvae that will become queen bees are given royal jelly throughout their larval and adult stages. According to Akyol (2015), royal jelly is a nutritious snack with a creamy, bone-colored odor and a sour-bitter flavor. In many nations, royal jelly is used in commercial items such as dietetic, cosmetic, and medical products. Royal jelly is a viscous milk-like bee product utilized by

young worker bees (*Apis mellifera* L.) to feed their larvae released from the mandibular and hypopharyngeal glands. The main components of royal jelly are water, proteins, sugars, lipids and minerals. Water makes up roughly two-thirds of fresh royal jelly. Royal jelly contains all necessary amino acids. The primary constituent of royal jelly is 10-hydroxydecanoic acid (10-HDA). The amount of 10-HDA found in royal jelly is a quality indicator (Sabatini et al., 2010). The amino acid composition of royal jelly contains 29 different amino acids, including aspartic acid and glutamic acid, and these amino acids include all essential amino acids for humans (which cannot be synthesized by the body and must be obtained from outside sources) (Howe, 1985). It is high in protein, amino acids, fats, vitamins, and carbohydrates and has excellent nutritional qualities. It's a jelly-like substance. Royal jelly is effective on cell renewal, production and metabolism. For this reason, it provides health, energy and immunity along with vitality in all tissues (Aydın and Tekeoğlu, 2018).

It contains protein, fat, carbs, vitamins C, D, A, B, and E, as well as minerals P, K, Ca, Na, and Mg. According to studies, 10-hydroxy-2-decenoic acid, one of the fatty acids in its composition, has an antibacterial activity against various bacteria and fungi (Bilgi, 2017). Because of its nutritional characteristics, proteins, unique fatty acids, and other minor components, royal jelly is one of the items with great biological usefulness (Xue et al., 2017). Furthermore, royal jelly protects the skin from UV radiation and slows the aging process caused by light (Beltekin and Demir, 2022). The color of royal jelly is creamy. Royal jelly and bee larva are seen in Figure 9 (Mutlu and Erbaş, 2020; Koç and Bakır, 2021).



**Figure 9.** Royal jelly and bee larva

Royal jelly can be drunk fresh from the hive, but there are also powder and pill versions available. However, because the amount of water in it is high, it does not have a long shelf life due to the risk of moisture, therefore it is best consumed right once (Mutlu and Erbaş, 2020).

Royal jelly has been linked to a wide range of pharmacological properties, including blood vessel dilation and blood pressure reduction, anti-inflammatory, anti-tumor, anti-fatigue, anti-allergic, antioxidative, antibacterial, immune-supportive, cell-repairing, and rejuvenation (Münstedt and Georgi, 2003; Jianke and Shenglu, 2005). Because of the antioxidants it contains, it has anticancer, immunomodulatory, and anti-allergic qualities, is antibacterial and anti-inflammatory, and has beneficial effects on the cardiovascular system by controlling blood pressure and cholesterol (Pavel et al., 2011; Viuda-Martos et al., 2017). Royal jelly is utilized in a variety of industries, including pharmaceuticals, food, cosmetics, and manufacturing. Today, there is a huge economic demand for royal jelly due to its ascribed remarkable biological characteristics, resulting in significant imports of royal jelly in nations that are unable to fulfill their own demands. China produces more than 60% of the world's royal jelly, followed by Asian nations such as

Korea and Taiwan. Japan, the United States, and the European Union are the top importers (Sabatini et al., 2009).

Royal jelly stimulates cell renewal in the body. It has reported that royal jelly possesses blood cholesterol, total lipid, phospholipid, and triglyceride levels, as well as blood pressure reducing and vasodilating activities (Anonymush, 2023). Royal jelly has anti-tumor, antibiotic, anti-inflammatory, immune system regulating, anti-allergic, general tonic, and anti-aging properties (Pavel et al., 2011).

Royal jelly is sold in a variety of forms on the market. Royal jelly is widely utilized in the market in frozen and freeze-dried (lyophilized) forms, as well as powder and tablet forms. It has been discovered that frozen royal jelly (at -18°C) has a longer shelf life than product placed in two refrigerators (+4°C), and that the freezing method is more successful in keeping the quality and freshness of royal jelly (Kumova and Korkmaz, 2000). Freeze-dried royal jelly is available in powder, tablet, and capsule forms. Although the loss of nutritional and biological qualities of these goods is tolerable, it has been suggested that large-scale investments are required for the facility's construction and operation (Sabatini et al., 2009; Bogdanov, 2012).

In the 1960s, with the introduction of apitherapy, royal jelly was employed as a functional food. Many investigations on the chemical composition and biological activities of royal jelly have been done. Because of its biological properties, royal jelly is employed in a variety of industries ranging from pharmaceutical to food, cosmetics to manufacturing.

## **5. Bee Venom**

Dr. Franz Kretsky created an injectable version of bee venom invented it in Austria in 1928. Parallel to these advances, the Apitherapy Association was founded in America, and it is still active today. American Doctor Christopher Kim patented the first standardized form of injectable bee venom in South Korea in 2003 under the name 'Apitoxin' (Bulut and Lenger, 2015). Bee venom is a substance produced in the venom bag of bees that contains high levels of mellitin, apamin, MCD-peptide, histamine, hyaluronidase, and phospholipase-A2 (Şahinler, 2000). Before World War II, bee venom was employed for medical purposes in Far East Asia. It was utilized for therapeutic purposes in the century, particularly in Ancient Egypt, Greece, and China. It is reported that

Hippocrates used bee venom for the treatment of arthritis (inflammation of joints such as knees, feet, elbows and fingers) (de Graaf et al., 2021). The medical use of bee venom, in particular, was practiced in ancient Egypt, Greece, and China, and was further expanded during the nineteenth century through modern research of apitherapy. Today, because it is beneficial to many ailments, its production and use in medicine are expanding. According to the available information, the specific composition and method of action of such a poison dates back barely 50 years (Moreno and Giralt, 2015).

Apitoxin, or bee venom, is stored in the venom sac in the bee's abdominal cavity. This poison contains approximately 0.3 milligrams in the poison tank. Apitoxin's main action is provided by peptides containing amino acids, and melittin guarantees that 50% of these peptides are swiftly incorporated into the bloodstream. Melittin has antibacterial, antifungal, nervous system balancing, and radiation protection properties. It enhances capillary permeability, promotes smooth muscles, and reduces blood pressure. Mellitin is the most notable bioactive anticancer chemical found in bee venom. It has been observed that mellite created synthetically alone suppresses cancer cell development (Duffy et al., 2020). Bee venom, also known as apitoxin, has long been used in folk medicine to reduce pain and treat inflammatory disorders such as arthritis and rheumatism. While it has been used directly by the people as a bee sting since ancient times, bee venom can also be utilized as a medication today. The first scientific investigation on bee venom was conducted in the late 1800s by Austrian physician Philip Terc, who stated that bee sting treatment cured rheumatic patients (Bellik, 2015).

In the event of a bee sting, the venom from the venom tank is injected into the sting location via the venom canal. It is administered following the bee sting, as seen in Figure 10 (Altıntaş and Bektaş, 2018).



**Figure 10.** Appearance after bee sting

The most common way for collecting bee venom is to have the bees discharge their venom on a glass surface for a set amount of time while an electric current is applied to the glass surface and small wires, which does not kill the bees but stimulates and disturbs them. As a result, the bees do not lose their venom stings, they live, and it is possible to retrieve and collect the venom (Bogdanov, 2016; de Graaf et al., 2021).

Its molecular structure is made up of roughly 50% polypeptide mellitin. It has anti-inflammatory, radioprotective, antibacterial, antifungal, and anticancer properties. It also stimulates the adrenal gland, which increases catecholamine and cortisol release (Sorucu, 2019). Acupuncture treatment is being done with bee venom. As a result, it appears to lessen neuropsychiatric diseases by reducing musculoskeletal and neurological pains (Şahinler et al., 2019).

Bee venom is most commonly used as an apitherapeutic in the treatment of rheumatic disorders (joint pain, back pain, and arthritis) and as an

acupuncture agent, acting as a stimulant that activates the nerve system (Sobral et al., 2016). Bee products other than bee venom from apitherapeutic products are used as food additives, dietary supplements, and medical goods, but when the utilization areas and treatment of bee venom are performed under controlled conditions, it has been described as a successful treatment approach (Anonymous, 2023i). There are also clinical studies to evaluate the beneficial effects of bee venom serum on aging skin (Han et al., 2015).

Lee et al. (2008) investigated and reported that bee venom injections of bee venom can be used in rheumatoid arthritis, multiple sclerosis, lupus, low back pain, sciatica pain, tennis elbow, and other soft tissue rheumatism. They also indicated that the average lethal dose for adults in these applications is 2.8 mg/kg, which is equivalent to 560 bee stings (each bee sting has 0.3 mg venom). Acupuncture with bee venom is also used nowadays, notably in recent years. This approach is expected to alleviate musculoskeletal discomfort, neuropsychiatric issues, and neurological pains (Cherniack and Govorushko, 2018). A bee venom allergy test should be performed initially, and the therapy should, of course, begin under the guidance of a specialized doctor. It is strongly advised not to take bee venom if you have tuberculosis, gonorrhea, endocarditis, or are pregnant (Derebaş and Canbakal, 2009).

There have been numerous studies on bee venom conducted throughout the world. Apiterpy research have played a significant influence in the evolution of the usage of bee venom. However, in our country, as in propolis, the essential attention is not paid to bee venom.

## **6. Bee bread (Perga)**

Bee bread is a bee product that is not easily gathered and is not yet accepted by many beekeepers since it is difficult to harvest and the honeycomb is lost during harvest. "Bee bread/perga" is produced through lactic acid fermentation after pollen collected from plants and combined with digestive enzymes is kept in honeycomb cells. Honey bees utilize perga mostly to feed larvae and young bees generating royal jelly. Bee bread (perga, ambrosia) is a unique bee product that benefits both bees and humans. Bee bread basically contains pollen, honey and salivary gland secretions of bees. It is filled in honeycomb cells and fixed with honey and beeswax. It ferments in the comb cell due to lactic acid fermentation, and the fermented pollen is known as "bee



bread/perga." According to its chemical composition, bee bread is more digestible than pollen and has a higher nutritional content.

On the bee side, it is likewise a particularly fermented pollen. The worker bees using digestive enzymes and honey squeeze the pollen contained in the honeycomb cells, and the honeycombs are wax-coated. Pollen kept in honeycomb cells completes the fermentation process for about two weeks, maturing and becoming suitable for bee nutrition thanks to microorganisms. Pollen that has matured because of fermentation in honeycombs is referred to as 'perga' or 'bee bread' in this context (Mayda, 2020). Microbial activity, primarily lactic acid fermentation induced by bacteria and yeasts, results in the transformation of pollen into bee bread and biochemical alterations (Haydak, 1958). It is the primary meal of both the young and queen bees. Perga has at least three times as much bioactive material as pollen. It has a high concentration of selenium (Se). Vitamins A, B1, B2, B3, B6, B12, C, PP, E, D, K, H in its structure; P, S, Cl, K, Ca, Na, Mg, Fe, Cu, Zn, Co, Mo, Se, Cr, Ni, Si minerals; it contains amino acids phenylalanine, leucine, valine, isoleucine, arginine, histidine, lysine, methionine, threonine and tryptophan. Figure 11 depicts a perga being extracted from a honeycomb (Karaman et al., 2017).



**Figure 11.** Perga extracted from the honeycomb in pure form

Bee bread is more dense and has a higher nutritious value than pollen. According to studies, pure flower pollen has a protein content of 24.8% while bee bread has a protein content of 34.48% (Yılmaz, 1988; Sorkun, 1987). Bee bread, according to experts, can be eaten by chewing or blended with foods such as milk and yoghurt. Adults can eat 6-12 pieces per day, while youngsters can eat 3-6 pieces. It is an extremely digestible meal. It is lower in starch, higher in carbs, and higher in lactic acid than pollen (Nakilcioğlu and Nurko, 2022). Perga, a fermented meal, has a substantially better bioavailability than bee pollen. The pollen obtained by field worker bees is transported to the hive by mixing it with honey bee secretions and depositing it in the pollen basket (corbicula) on the honey bees' hind legs. To prevent spoiling, the hive is emptied with the assistance of other young worker bees and covered with a thin layer of honey and beeswax mixture. This mixture is subjected to chemical changes caused by various enzymes, bacteria, humidity, and temperature (35-36 °C). This pollen that has been preserved and is undergoing chemical modifications is referred to as bee bread (Vásquez and Olofsson, 2009).

The high biological activity of bee bread inhibits mold and fungus growth and allows for better bee bread preservation (Nagai et al., 2004). The antibacterial activity of bee bread and pollen samples collected from the Moroccan region was studied in a study. Both dried and fresh pollen samples were employed in the study, and antibacterial activity tests were done against bacteria such as *Escherichia coli*, *Staphylococcus aureus* and *Bacillus cereus*. As a result, fresh bee pollen and bee bread were found to have stronger antibacterial activity than dried pollen samples (Abouda et al., 2011). Andelkovic et al. (2015), the lipid content in Serbian bee bread samples ranged from 4.51 to 4.92%, while the protein amount in Colombian and Serbian bee bread samples ranged from 27.6-29.9%, respectively. According to their findings, potassium was the most abundant mineral in dandelion and honeybaba bee bread samples, followed by calcium and magnesium.

In a trial, 35 patients aged 24 to 49 were given a remedy consisting of a teaspoon of bee bread-honey mixture three times a day for one month, and at the end of the period, 82% of the patients reported increased vitality, hunger, and weight gain, as well as increased physical concentration. Again, 92.8% of the patients' complaints of headache, anemia, weakness, fatigue, and dizziness were determined to have significantly improved. It aids in the treatment of

anemia by increasing the amount of hemoglobin and erythrocytes in the blood (Leonavichius, 1978).

Enzymes contained in bee bread; amylase, phosphatase and glucosoxidase while amino acids; it contains glutamic acid, aspartic acid, proline, amino acid, arginine, valine, histidine, leucine, isoleucine, lysine, methionine, tryptophan phenylalanine, threonine, cysteine tyrosine, alanine, glycine. Studies on the chemical content of bee bread generally show that it consists of water, proteins, free amino acids, carbohydrates, fatty acids and other bioactive molecules. It is also shown to have components such as phenolic compounds, alpha-tocopherol and coenzyme Q10. The composition of bee products may vary depending on the plant source from which the pollen is collected, climate and seasonal conditions. This feature makes its standardization difficult.

## **7. Wax**

Beeswax is a multi-component material that mediates bee communication, acts as an absorber for many pollutants (pathogens, toxins, and waste), and serves as a food storage, brood rearing, and thermoregulation area for honey bee colonies (Svenjak et al., 2019, Buchwald et al., 2006; Topal et al., 2020). Hydrocarbons (14%), beeswax (14%), monoesters (35%), diesters (14-0), triesters (3%), hydroxy monoesters (4%), hydroxypolyesters (8%), free acids (12%), acid monoesters (1%), acid polyesters (2%), and unidentified compounds (7%) (Tulloch, 1971).

Beeswax, like honey, has various therapeutic benefits that are highly sought after. It is thought to be particularly beneficial in the treatment of dental decay, inflammation, and burns. Antimicrobial and antifungal properties of beeswax, as well as beeswax/olive oil and beeswax/honey combinations, have been discovered in recent years (Fratini et al., 2016).

To create their honeycombs, worker bees release beeswax from specific glands in the segments of their abdomen rings. Beeswax is generated under mild climatic conditions during the growth phase of bee colonies, which occurs between April and June (Hepburn, 1986). Beeswax was first mentioned in a papyrus created in Egypt approximately 1550 BC, in 32 recipes. The Persian empire utilized wax to keep the memory of the dead alive, while the ancient

Romans employed it to build death masks and sculptures. Wax was employed as an adhesive to bind two surfaces in ancient times (Brown, 1981).

It is made from complicated compounds secreted by four pairs of glands in the abdomen of honey bees and contains a variety of monoesters (35%), diesters (14%), triesters (3%), hydroxy esters (12%), and long chain free fatty acids (12%). Mammals due to these components cannot digest wax, which is insoluble in polar solvents such as water. Bees utilize beeswax for a variety of purposes, including the incubation of young in hives and the storage of honey and pollen. Beeswax is employed in a variety of industries, including cosmetics and pharmaceuticals (Schmidt, 1997; Mutlu et al., 2017).

### **8. Apilarnil and Queen bee larva**

Apilarnil is a bee product with a high production potential that is relatively unknown in our country. Apilarnil is a combination of Api (latin bee), Lar (larvae), and Nile (Nicolae Iliesiu; the first letters of the person who discovered the effects of the substance). Apilarnil is defined as the 3-7 day larval period of drone bee larvae that occurs before the honeycomb eye closes, i.e. before the pupal period (Yücel and Kösoğlu, 2015; Şahin et al., 2019). Nicola Iliesiu in Romania first utilized Apilarnil (drone larva) in the elderly with psychotic, neurological, and sexual diseases in 1980. Nicolae Iliesiu, a Romanian scientist, coined the name Apilarnil from the Latin name for bees 'api' (*Apis mellifera*), 'lar' from larvae, and the initials 'nil' (Erdem and Özkök, 2018). Apilarnil increases spermatogenesis in males, according to research, because it is derived primarily from the male structure and is high in androgenic hormones. As a result, apilarnil's androgenic and anabolic effect is seen as a natural alternative to pharmaceuticals and chemicals for promoting sexual development (Tunca et al., 2016).

Apilarnil is the larval stage of drone larvae that lasts 3-7 days before pupating. Because of the egg and larval structure, it has a high biological activity. Apilarnil is classified as a "whole food" since it contains all essential amino acids, which are the fundamental building blocks of our bodies (Topal et al., 2018). Another popular bee larva recently is queen bee larva. Royal jelly is obtained during the milk harvest by harvesting 3-day old queen larvae from the queen cell (Mărgăoan et al., 2017). Apilarnil is beneficial for a variety of causes, including appetite loss, hypoproteinemia, rapid aging, geriatric

depression, genital illnesses, hormone and vitamin deficiency (Yücel et al., 2019).

Although it is not commonly used, beekeepers cut and discard honeycomb-containing apilarnil. Among its numerous positive features, apilarnil is known to have antiviral, immune system boosting effects, as well as enhancing the body's energy, vitality, and regenerative power. This product has a milk-like consistency and a high concentration of amino acids, minerals, carbohydrates, fatty acids, and androgenic hormones (Çelik and Aşgün, 2014; Anonymous, 2023j).

Figure 12 depicts the bee larvae in the comb cells. Furthermore, because apilarnil contains valuable nutritional compounds, it is claimed that it aids in the treatment of many health problems such as providing vitality to the body, cell renewal, regulating reproductive physiology, and treating nervous system disorders (Topal et al., 2018).



**Figure 12.** Bee larvae in honeycomb eyes

Apilarnil is a "whole food" since it contains all of the essential amino acids. Because it is a very sensitive bee product, it must be kept with a cold

chain, and it must be brought into a proper shape with modern processes for long-term use. Lyophilization is the optimum approach for long-term Apilarnil use (Açikgöz and Yücel, 2016). The main reason Apis larvae and pupae are used as an alternative food source is because they have a high nutritional value comparable to beef in terms of protein quality and quantity. Apilarnil is a natural product with high nutritional value that can help to eliminate malnutrition disorders (Van Huis et al., 2015).

Free amino acids are the most abundant components in apilarnil and queen bee larvae homogenates. Sarcosine, Beta alanine, homoserine, 4-hydroxyproline, gamma-aminobutyric acid, and pyroflutamic acid are among them. Queen bee larvae contain more free and necessary amino acids than apilarnil. The concentrations of fructose (0.4%) and glucose (6%), respectively, in queen bee larvae homogenate were calculated to be 6.5% and 57% in apilarnil. The final homogenate also contains trace levels of maltose and isomaltose ( $0.9\pm 0.5\%$ ). Other compounds discovered in queen bee larvae include a rather high amount of isomeric inositols, nucleosides, uridine, adenosine, and biomolecules with numerous physiological effects (Gavrila-Ardelean and Gavrila-Ardelean, 2017). Grayanotoxin binds to the sodium (Na) channels in the cell membrane, blocking them and causing a rise in peripheral vagal tone. It is found primarily in the hilly areas of Turkey's Eastern Black Sea region (Gündüz et al., 2008).

## **9. Crazy honey**

People also refer to it as bitter honey or amount honey. When ingested in excess, it displays indicators of toxicity. The popularity of DB is growing by the day because to its use as food, ease of availability and widespread use in alternative medicine, and poisoning from this honey is becoming a worldwide problem. This type of food poisoning, which is extremely dangerous because of its cardiovascular effects, can be fatal (Çetin et al., 2009). Symptoms include skin and throat burning, redness, headache, nausea, vomiting, stomach pain, urine incontinence, fever, bradycardia, and hypotension. Figure 13 depicts *Rhododendron* variants with five species in delibal production (Çeter and Güney, 2011). Toxic effects are caused by the grayanotoxin contained in honey (Özhan et al., 2004; Hancı et al., 2010; Yaylacı et al., 2014; Yaylacı et al., 2015). Grayanotoxins in crazy honey operate at the cellular level on voltage-

dependent sodium ion channels, inducing sodium channel blockage by blocking action potential transmission and generating bradyarrhythmias (Jansen et al., 2012).



**Figure 13.** Rhododendron varieties

It includes grayanotoxin, which can induce toxicity if swallowed. Poisoning can occur with the consumption of 5-30 g delibal, and it can be fatal for children, adults, and the elderly, according to studies. However, it has been noted that in these poisonings, recovery is noticed within 24 hours, and the symptoms of poisoning are nausea, vomiting, acute pain in the throat, respiratory issues, and muscle weakness (Kurtoğlu et al., 2014). According to studies, the symptoms of crazy honey poisoning are totally resolved in a few hours to 72 hours. However, in severe poisonings caused by significant amounts of honey, gastric lavage or vomiting is used to eliminate the toxin from the gastrointestinal tract (Uğur et al., 2015).

Consumption of mad honey is an important public health problem because it can cause serious cardiac and neurological problems. We can share that the use of mad honey in alternative treatment will be appropriate because of scientific studies and the results of these data.

Apitherapy, or the use of bee products for the prevention or cure of one or more ailments, is as significant in alternative medicine now as it was in the past. However, in order to use these goods, it is required to precisely define the allergen effects and dose amounts; it is believed that intensifying toxicological studies will benefit human health. As a result, it is projected that awareness and conscious usage of bee products would expand in numerous industries such as food, medicine, pharmacology, and cosmetics in the next years.

Bee products, which are high in bioactive components, have long been employed in a variety of industries, particularly medicine, cosmetics, and the food industry. The most extensively utilized bee product is honey, which is one of the bee products used for illness treatment, food enrichment, and preservation. Although propolis, royal jelly, bee pollen, bee venom, beeswax, apilarnil, and bee bread are less well-known and consumed bee products, the elements in their composition make them at least as effective as honey in preserving and nourishing meals. The commercial value of bee products is growing in popularity.

### **G) Cup (Hijama)**

Cupping therapy, one of the oldest GETAT uses, comes in a variety of forms, but it is most commonly administered with wet and dry cups (Ullah et al., 2006). Cupping therapy has been practiced for almost 5000 years, and the earliest recorded materials on the subject are from 3300 BC in the text "Ubi Plethore Ibi Evacua." (Bamfarahnak et al., 2014).

The word hijama derives its primary meaning from the word 'Hacm'. It literally implies sucking, tugging, and vacuuming. In this context, the individual who does the cupping technique as if explaining his labor is referred to as 'Hajjâm,' or the one who vacuums the air (of the cupping cup). The application is said in this manner to demonstrate that this word pertains to the concept of "sucking, vacuuming" (Nuaym, 1998). Hijama application is also defined as "the process of drawing blood by lightly drawing certain parts of the body and placing horns, glass cups, mugs with manual pumps, or bottles on the scratched areas." In Arabic, hijama means to return to its original shape. It is the process of clearing blockages in parts of the body where waste materials and dead cells accumulate, as well as dirty blood in capillaries and thin veins (Salih, 2016). Cupping is a disease-treatment procedure that is particularly



popular among Islamic physicians (Kılınç, 2015). According to various hadiths, the Prophet Muhammad (S.A.V.) employed cupping as a preventive medication in order to prevent diseases and in the treatment of his own diseases, and he recommended it to his ummah (Şeker, 2013).

Hijama application has been practiced for thousands of years in Middle Eastern, Asian, African, and European civilizations. Cupping has been used in Traditional Chinese medicine alongside various surgical treatments and acupuncture treatment, and its favorable effects in other medical diseases have emerged and continued to grow as an independent treatment method. Bo Shu, written on silk (The Chu Silk Manuscript) approximately 300 BC, is the first written source of cupping practice in Chinese medicine (Chirali, 2014).

Hijama is a technique that "with the help of regional vacuum tools, it is a process that allows the blood to be safely taken by creating superficial skin incisions, mostly of toxic substances belonging to capillaries, which block the energy in the body" (Sert et al., 2015). Cupping therapy is commonly classified as wet and dry cupping, and wet cupping therapy, which is utilized more frequently in the community, is also known as 'hijama' (Anonymous, 2023k).

Cupping therapy is a type of treatment in which cups of various sizes are placed on certain regions of the body and subatmospheric pressure is applied using heat or vacuum (Mehta and Dhapte, 2015). Cupping therapy is used in a variety of ways. These;

1. Dry mug
2. Age Cup (Hijama)
3. Animated mug
4. Empty mug
5. Needle mug
6. Water mug
7. Hot mug
8. Herbal can be classified as mug (Okumuş, 2016).

It is classified as dry and wet cup using the most common ways. The cup application's goal is to raise blood flow rate by causing vasodilation, interstitial fluid, and temperature increase in specific areas of the skin via vacuuming. Blood is not drawn in the dry cup application. Only when the cup is applied

does the air inside the cup escape and the skin swell. Circulation is accelerated, and a massaging effect is created. The wet cup application begins similarly to the dry cup application, but superficial incisions are performed to drain blood from the surface of the enlarged skin (Çiftçi, 2019; Sarkan and Savaş, 2020). Hijama is another name for wet cup application. Positive outcomes have been observed in the treatment of several pain syndrome conditions such as hypertension, headache, low back pain, osteoarthritis, rheumatoid arthritis, and fibromyalgia (Parlakpınar and Polat, 2020).

According to research on the classification of cupping therapy, the wet cupping method relates to cupping under the title of technical types of treatment, which is split into five main groups. The idiom "drawing a cup, drawing a bottle" is widely used to describe the dry mug method. In both approaches, the cups are put at certain places on the body to activate blood circulation by producing a vacuum. Small cuts are made on the vacuumed area in the wet cup, that is, in the cupping system, to allow unclean blood to escape (Qureshi et al., 2017). It has been determined that a healthy person should receive hijama treatment in the spring and autumn. However, today, due to the increase in epidemic diseases and chronic diseases, hijama is applied in every season (Benli, 2017).

Cupping therapy can be used on a variety of anatomical areas. The cups are most typically put in locations with a high concentration of muscles. Back, chest, abdomen, and hips are examples. Anatomical locations where hair is profuse, muscle tissue is rare, and there is insufficient surface area to store containers are avoided (Okumuş, 2016; Furhad and Bokhari, 2019). As follows, we can match the region of hijama treatment for treatment (Salih, 2018). 1. Pancreas, lung, bile, and heart problems can be found between the shoulder blades. 2. Herniated disc, low back pain, reproductive organ and kidney problems under the shoulder blades. 3. Headache, vertigo (dizziness), scalp disorders, eye diseases, ear diseases, and psychological diseases (stress, depression...). 4. Waist: Herniated disc, low back pain, urine incontinence, renal and reproductive organ dysfunction. Hemorrhoids, prostate, elephantiasis, and menstrual abnormalities are all symptoms of the Coccyx. 6. Shoulders and chest: High blood pressure, lung disease, dizziness, headache, neck hernia and neck calcification, hormone imbalance, shoulder pain. 7. Knee illnesses, knee discomfort, varicose veins, foot and calf wounds (above and below the knees).

8. Calf-foot soreness, calf sores, psoriasis, elephantiasis, and elevated blood pressure. 9. Varicose veins, sciatica (nerve compression), gout, and elephantiasis in the ankles.

Cupping has also been linked to neurological, hematological, immunological, metabolic, and psychological benefits. It has been utilized in the treatment of ailments such as digestive issues, discomfort, skin diseases, and muscular spasms since ancient times (Tanrikulu and Turker, 2021). Cupping boosts immunity, increases oxyhemoglobin levels, decreases deoxyhemoglobin levels, and hence speeds up tissue regeneration. When the effect of cup treatment on athletes was explored in a study, good results such as decreased performance, sleep quality, and soreness after sports or matches were observed (Akkurt, 2020).

It refers to blood sucking, also known as 'Wet Cupping' in English and 'Hijame' in Arabic. Cupping is defined by Ibn Sina as the removal of toxic substances in the body by blood via wounds made to certain parts of the skin. Cupping is the removal of some unclean blood deposited in the subcutaneous capillaries, which is not the same as blood removal. Toxins in the blood are thus eliminated, vascular obstructions are freed, and blood circulation is increased (Qureshi et al., 2017; Benli, 2017). Cupping is supposed to restore physiological balance by eliminating potentially toxic elements that cause diseases from the body (El Sayed et al., 2013).

Local skin and capillary injury has been observed to act as a nociceptive stimulation (Han et al., 2016). Hijama, or mug application, is separated into two types: wet cup application and dry cup application. By scratching various regions of the body, glasses, mugs, and so on. While wet mug application involves taking blood with materials, dry mug application involves only mug creation without scratching or bleeding (Doğan, 2016). Cuts in the skin during cupping result in the release of adrenocortical hormone and the endogenous opioid  $\beta$ -endorphin. Analgesic action is produced by activating opioid receptors in  $\beta$ -endorphin nociceptors (Parlakpınar et al., 2020). Figure 14 gives the Hijama Process (Unat, 2018).



**Figure 14.** Hijama process.

Toxins are discharged from the intravascular area because of the negative pressure caused by several cupping applications in hijama. Thus, hijama reduces impediments to blood flow and promotes toxins to be expelled from the body. The amount of Causative Pathological Substances (CPS) excreted, rather than the volume of blood eliminated, determines actual efficacy (El Sayed et al., 2013; Al-Bedah et al., 2019).

It is used to treat restlessness, sleep issues, distraction, and hyperactivity in children. Cupping is not recommended for patients with metastasis, cancer, dialysis, hemophilia, anemia, recent surgery, and low platelet count, during menstruation, skin disorders, vertigo, and areas with moles, dermatitis, and skin sores (Benli, 2017).

Another concern with hijama application is that "a diet free of protein and animal food consumption is recommended two or three days before and three to seven days after the application." Because blood flow to the skin reduces with increased mesenteric artery circulation after meals, this application can also be performed on an empty stomach. It is recommended that

the individual who has undergone hijama treatment refrain from bathing for at least three days following the application (Ahmadi et al., 2008).

Cupping therapy, which has been applied since ancient times and is increasing in popularity today, is an easy-to-apply, inexpensive and low-side-effect method preferred in the protection and treatment of health.

### **5.3. BIOLOGICAL-BASED TREATMENTS**

#### **A) Herbal Treatments (Phytotherapy)**

It is defined as the use of plants in the prevention and treatment of disease formation, derived from the Greek terms phyton 'plant' and therapein 'therapy'. It is used to treat leaves, seeds, flowers, roots, or bark that can be considered herbal medicine or medicinal plants. While it is presently considered an alternative medicine due to its historical development, understanding, and application, it has also pioneered numerous medical disciplines (Çiftçi and Samur, 2017). Phytotherapy is an effective treatment strategy for disease treatment and prevention that employs complete plants or plant parts such as flowers, leaves, seeds, and roots (Kurhan and Ekinci, 2021).

According to current studies, the number of plants on the planet ranges between 250.000 and 500.000. According to WHO data, a considerable proportion of today's population (70-80%) benefits from "traditional medicine" for treatment or prevention. It is estimated that over 70.000 medicinal plant species are employed for this purpose. 21.000 plant species have been employed in medication preparation (Başaran, 2012). The use of medicinal plants to treat ailments has recently grown in popularity under the banners of "alternative medicine," "traditional medicine," or "complementary medicine." At the same time, other countries employ terms such as natural medicine, folk medicine, participatory medicine, folkloric medicine, holistic medicine, and supportive medicine (Ersöz, 2012).

To gain the quality of medicine in phytotherapy, the plant must take its place in phytotherapy dialogues. Simultaneously, its usage in youngsters and pregnant women takes precedence in these dialogues. Wall ivy (*Hedera helix*), Medicinal chamomile (*Matricaria chamomilla*), Thyme (*Thymus vulgaris*), and St. John's Wort (*Hypericum pertorotum*) are some plants that can be utilized in children. When 11 research on complementary and alternative medicines

published in the last ten years were examined, it was discovered that biological-based techniques were utilized the most frequently, with herbal preparations being employed between 60% and 92% of the time. Nettle was discovered to be the most widely utilized herbal preparation (Doğan, 2016).

Phytotherapy is expected to be a considerably more popular method than in the past. However, failing to use methods such as plant purification and extraction can result in a significant harmful side effect in the treatment. Plants contain a variety of chemicals in their structure, including alkaloids, glycosides, flavonoids, and polysaccharides. These chemicals may interact with a variety of biological agents and receptors, resulting in unfavorable clinical outcomes (Kanat, 2019). Flavonoids, plant-derived chemicals, have been shown to have antiviral activity (Uçar et al., 2020).

Phytotherapy is a natural treatment with a long history. Medicinal plants, which had previously been utilized by individuals in Western countries, began to be chosen by physicians as a complementary treatment in the years that followed. In 1978, Commission E, which was founded in Germany, issued a study analyzing the clinical effects of 300 plants and attempted to standardize herbal medicines with this report in the years that followed (Yıldırım et al., 2020). Furthermore, Hippocrates established the basis of modern medicine, and when he does not choose animal products, he uses nearly 200 plants in his treatment, which is documented in Hippocrates' own works. Table 9 displays Hippocrates' herbal treatments (Özdemir ve Erdal, 2021).

**Table 9.** Herbal medicines used by Hippocrates

| <b>Plants</b> | <b>Usage areas</b>  |
|---------------|---|
| Mastic Tree   | Gynecological problems, Skin problems, Wound treatment        |
| Juniper trees | Pain relief, Postpartum tremor, Hysteria                      |
| Pomegranate   | Anti-inflammatory, Diarrhea, Intestinal Parasites, Detox      |
| Myrtle Tree   | Abdominal pain, Female genital hygiene, Skin problems         |
| Fennel        | Lactation stimulation, Menstrual troubles                     |
| Wormwood      | Indigestion, Arthritis, Intestinal Parasites                  |
| Mint          | Diuretic, Antiemetic, Uterine Cleansing, Diaphoretic          |
| Sage          | Astringent, Anticoagulant, Inflammation, Fever, Lung diseases |

The term "aktar," which was previously used to describe the tradesmen, who supplied the materials required for the creation of medicines, is derived from the Arabic word "akarir," which meaning medications or medicinal substance. During the Seljuk and Ottoman periods, herbalists were also known as "Akkar" or "Attar" and sold animal and mineral drugs in addition to herbal drugs. Herbal medicine, which is one of the most important touchstones of folk medicine, has lost its effective value as a result of many years of experience and has devolved into organizations that merely deliver therapeutic herbs and spices to the public (Sargin et al., 2013). Furthermore, due to the exaggeration of interest in herbal medicine in the written and visual media in recent years, there has been a notable increase in the number of herbalists opened. People utilize the drugs they obtain from herbalists without scrutinizing them, believing that they are fully natural and harmless (Tülükçü and Sağdıç, 2011). It should be clear which approach, which plants, and what proportions of the medicine should be employed. Otherwise, it should not be forgotten that negative outcomes, including death, may occur (Bulut et al., 2017).

Phytotherapy is a method that evolved from the traditional use of plants and is based on the clinical study of in vitro and in vivo effects (Aydoğan and Aslan, 2022). It spreads everywhere in regions where phytotherapy is practiced. Medicinal teas are one of the phytotherapy application methods that have medicinal characteristics by preparing single or several plants and devices together. Plants with a broad therapeutic impact should be preferred (Üstü and Uğurlu, 2018). According to research, medicinal teas have a high antioxidant content and a high quantity of phenolic components. Its therapeutic effects make it beneficial for a variety of ailments. As seen in Table 10, the plants to be used in some diseases are given unless otherwise seen (Göktaş and Gıdık, 2019).

**Table 10.** Plants to be used according to diseases

| Diseases       | Plants used   |
|----------------|---|
| Indigestion    | Anise, dill, cumin, chamomile, fennel, ginger, allspice |
| Constipation   | flaxseed, fennel, cassia                                |
| Heart diseases | Hawthorn, mistletoe                                     |
| Cancer         | Stinging nettle, red pepper                             |
| Menopause      | Sage, anise, cinnamon, clove, chamomile                 |

|                             |  |
|-----------------------------|--|
| Stomach pain and nausea     | Mint, Ginger, Spinach Root   |
| Rheumatism                  | Horsetail, thyme, clove, lavender, lemon balm  |
| common cold, chills         | Juniper, mallow, echinacea, linden, mint, chamomile, ginger                                  |
| Stress, depression, anxiety | St. John's Wort, lavender, lemon balm, fennel  |
| Forgetfulness               | Rosemary, cardamom, green tea, ginger  |
| Tiredness                   | Licorice, rosemary, thyme, rosehip, ginger   |
| high sugar                  | Mahleb, cinnamon, potency pomegranate  |
| high cholesterol            | Thyme, rosehip, grape seed, green tea  |
| Weakening                   | Cherry stem, rosemary, mate leaves, corn silk, fennel, cinnamon, green tea, ginger, turmeric |

Herbal teas are regarded to be beneficial in reducing and controlling the pain associated with diarrhea, bloody stools, and stomach cramps caused by intestinal inflammation. According to a 2016 study conducted in China, consuming herbal teas may help reduce the development of ulcerative colitis (Niu et al., 2016). According to a new study published in 2019, those who used ginger had less severe ulcerative colitis (Nikkhah et al., 2019). Herbal-assisted treatments should not be utilized in infants and youngsters 2-3 weeks before a procedure because the duration of action is unknown. When used, it can affect the activity of the liver enzyme CYP450, and when combined with prescribed drugs, it can be hazardous or render them useless. Because suitable clinical trials on children have not been conducted, the optimal dose range that can be utilized in children has not been described clearly and precisely (Çiftçi and Samur, 2017).

There are numerous plant species, and the amount of oil in most cultivated and wild plants varies. Soybean, cotton, peanut, sunflower, rapeseed, sesame, poppy, hemp, corn, olive, coconut, and date are the oily plants most widely utilized in oil manufacturing. Because of their volatility and inability to dissolve in water, oily plants have an influence on the respiratory system. According to studies, essential oils are biologically active, and their antibacterial, antifungal, and antiviral properties have been documented (Yurtvermez and Gıdık, 2021).

Adequate and balanced nutrition is one of the fundamental prerequisites for society and individuals to live healthy and strong lives, to progress



economically and socially, and to improve their standard of living (Bozhüyük et al., 2012). Many phytonutrients, including turmeric, pomegranate, black grape peel and seed, green tea, vitamin D, resveratrol, GLA, EPA, I3C, and boswellia, work by modifying gene expression at the cell control center level. Certain indicator disorders, such as vitamin deficiencies, will not occur if we do not consume phytonutrients or functional foods. Phytonutrients work in a quieter, more benign way: by influencing our genes' responses to environmental circumstances (Atasoy, 2018). The diet is regarded to be a major risk factor for cardiovascular disease. To prevent cardiovascular disease, current dietary guidelines advocate avoiding refined sugar, substituting saturated fatty acids with whole grains, and replacing animal and dairy proteins with vegetable proteins. In conclusion, cardiovascular disorders are polygenetic, reflecting the combination of a person's genes, nutrition, lifestyle, and environment (Marcum, 2020).

### **1. Phytotherapy in Wound Care**

Medicinal herbs are used at a rate of 60% worldwide, and 60-90% in underdeveloped nations. It is extensively utilized because of the beneficial effects of plants on wound healing. In addition to their anti-infection properties, medicinal herbs create a moist environment conducive to wound healing (Sürme and Rot, 2020). Plants have been shown to help with wound healing. Many scientific research has found that plant extracts are antibacterial, antimicrobial, anti-inflammatory, antioxidant, boost collagen synthesis, and activate fibroblasts, hence expediting wound healing. Plants that are commonly used for wound care include hibiscus, aloe vera, yarrow, rosemary, green tea, tea tree oil, and St. John's Wort (Turgut and Bedir, 2021).

### **2. Phytotherapy in Cancer**

Phytotherapy is used less frequently in Western countries than in the Far East. However, in most nations around the world, it is frequently favored in the treatment of numerous disorders such as cancer (Aydoğan and Aydın, 2022). Lung, breast, colon, and stomach cancers are the most frequent types of cancer in the globe. Because of the adverse effects of pharmaceuticals, there has been a growth in interest in phytotherapy; nevertheless, because there is no

intentional use, many side effects have been noticed in the treatment of patients with phytotherapy due to the components present in the plants. Cancer-fighting foods include turmeric, green tea, ginger, pomegranate, and garlic (İpek and Ergül, 2021). Since cancer is a great threat to humans now and in the future, it causes an increase in studies in this field (Jones et al., 2019). According to several research, herbal medications have shown favorable reactions in terms of the system of battling cancer cells and immune systems with each other. It has been demonstrated to inhibit tumor cell proliferation and spread in breast, ovarian, prostate, and lung cancer cells while increasing apoptosis (Wang et al., 2020). According to a recent study, a phytotherapy product containing a herbal mixture improves the destructive powers of macrophages on tumor cells (Liang et al., 2018).

Many of the medications used to treat breast cancer are derived from plants. Plant extracts isolated from *Taxus canadensis*, *Taxus brevifolia*, and *Taxus baccata* plants were found to have cancer therapeutic effects in highly advanced breast cancer, ovarian cancer, and lung cancer in the 1990s (Tagne et al., 2015). Many plants are employed in breast cancer phytotherapy, according to studies conducted around the world. Black cumin, mistletoe, turmeric, pomegranate, jujube, garlic, green tea, flaxseed, and wisteria are some of these plants (Aydoğan and Aslan, 2022).

It would be incorrect to claim that administering phytotherapy has no negative consequences. Phytotherapy might sometimes have negative repercussions. Inaccuracies in recognizing and labeling the plant, as well as identifying the plant just by its appearance, can lead to serious errors while using phytotherapy (Erdem and Eren, 2009).

## **B) Aromatherapy**

The therapeutic use of fragrant essential oils obtained from plants for physical and psychological well-being is known as aromatherapy. Aromatherapy has a 5000-year history, based on the usage of essential oils and other fragrant plants using distillation devices discovered in ancient study (Keville and Green, 2009). Aromatherapy is an ancient herbal medicine tradition used thousands of years ago in nations such as Egypt and India, although the French chemist Gattefossé in a book (Gattefossé, 1993; Cooke and Ernst, 2000) first used the term aromatherapy. Aromatherapy has been

practiced since antiquity. In Ancient Egypt, essential oils were utilized to protect the skin from the elements. They employed essential oils in rites and ceremonies to fight off evil spirits, cleanse the body, and purify the environment. Egyptians employed fragrant oils and herbs for mummification at the same time (Özer and Boz, 2016). When we look at the applications of medicinal aromatic plants in Anatolia, we can observe that the Anatolian people have used wild plants as medicine since very ancient times. The plant names in the formulas in the medicinal prescriptions on Hittite tablets are confirmation of this. It is also known that during this period, some essential medicinal plants were developed for medicine manufacture (Baytop, 1999).

Aromatherapy applications, which are included in complementary and holistic treatments, are among the World Health Organization's approved uses and are used to reduce pain, boost mood, relax, manage stress, and anxiety (Paula et al., 2017). Aromatherapy is a subfield of phytotherapy, which is a treatment method based on plants. Phytotherapy is a broader term that encompasses all plant-based treatments, whereas aromatherapy is a type of treatment that employs essential oils derived from plants in various ways (Özdemir and Öztunç, 2013; Bilgiç, 2017; Ünal et al., 2021).

Aromatherapy is a therapeutic practice for improving people's physical and psychological well-being that involves extracting fragrant essential oils from beneath the surface of plant leaves, bark, or bark (Onbaşı, 2019). It has a wide range of actions, including emotion and mood regulation, anxiolytic, antidepressant, arousal, memory augmentation, and repair of cognitive impairment in dementia illnesses. These effects are mediated through connections that extend to the limbic system and hypothalamus via the tractus olfactorius, the major olfactory pathway (Köse et al., 2002). There is numerous research in the literature on the human brain and odor emotions. Some of them have conducted research using cutting-edge technology instruments such as electroencephalograms and functional imaging. These researches have revealed that scents influence neurophysiological and autonomic activities, which in turn influence our physical and mental condition (Buchbauer et al., 1993).

Many essential oils are utilized in the treatment of ailments and the improvement of patients' health. Pharmacokinetics is the study of how essential oils are absorbed and eliminated by the body in aromatherapy applications. Essential oils are absorbed into the body through the skin (internal and

external), orally, and by inhalation, or smelling (brain and lungs) (Djilani and Dicko, 2012). One of the oldest and most successful approaches is inhaling essential oils into the body. The sense of smell is activated physically and neurologically by moving from the nasal mucosa to the blood circulation. The temporal lobe of the brain is where smell is registered (Fidan, 2018). Dermal application of essential oils allows them to penetrate the skin. The blood transports essential oils taken orally to the body and vital organs. One of the oldest and most successful approaches is inhaling essential oils into the body. It carries out physical and neurological functions via entering through the nasal mucosa and into the bloodstream (Yavuz and Esgin, 2022). Linalyl acetate and linalool components, which are the major components of lavender oil, were found in the blood after applying lavender (*Lavandula angustifolia*) oil to the skin, orally, or inhaling it (Buckle, 2015).

Essential oils are obtained by various methods such as solvent extraction, supercritical liquid extraction, microwave, expression under pressure, anflorage, and squeezing from fruit peels (Edris, 2007). These essential oils are a hundred times more intense and strong than plants and are used to prevent infection, balance growth rate, and cure tissues that need to be healed (Bilgiç, 2017). Although aromatherapy contains benefits such as enkephalin, endorphin, serotonin, and noradrenaline, it also promotes the elimination of many symptoms in cancer treatment since essential oils include antibacterial, analgesic, estrogenic, and steroid properties (Teskereci and Kulakaç, 2018).

These aromatic essential oils have antiemetic, antispasmodic, and digestive actions on the gastrointestinal tract, according to the literature (Farahani et al., 2019). Aromatherapy is used in another way in massage. It alleviates anxiety by influencing stress chemicals. Aromatherapy baths have also been shown to alleviate pain. Aromatherapy has a wide range of impacts on humans. These;

- Giving a sense of mental and physical cleanliness,
- Providing calmness and comfort,
- Having a sedative effect that prevents stress,
- Playing a supporting and regulating role in interpersonal relations,
- Giving a refreshment that encourages personal development,
- Providing harmony between humans and plants,
- Helping to cope with difficulties and adapt,

- Re-establishing mental and physical balance, thus reducing the risk of depression,
- The person sees himself in a comfortable environment
- It can be listed as providing high efficiency in interactive therapies such as massage and speech (Farrar et al., 2020; Gnatta et al., 2016). In addition, the effects of some essential oils on humans are shown in Table 11 (Öz, 2020).

**Table 11.** Effects of some essential oils

| <b>Essential oils</b> | <b>Effect</b>   |
|-----------------------|---|
| <b>Lavender oil</b>   | Soothing, sedative, analgesic and antispasmodic effect                |
| <b>Rose Oil</b>       | Analgesic and anxiolytic effect                                       |
| <b>Sandalwood Oil</b> | Anxiolytic effect   |
| <b>Sage Oil</b>       | Effective on anxiety and tension experienced during menstrual periods |
| <b>Eucalyptus Oil</b> | Effective in regulating the nervous system                            |

Aromatic oils work on the central nervous system to promote relaxation and drowsiness. This occurrence occurs because of neurohormonal transmission from the central nervous system to the limbic system (Ovayolu et al., 2014; Heydarirad et al., 2019). Aromatic oils have been reported to be used in massage, inhalation, and topical application, according to research. Inhalation was determined to be the most commonly employed method (73.3%). Lavender oil (60%) was the most often utilized aromatic oil for inhalation (Kurtgöz and Kızıltepe, 2022). Essential oils are absorbed from the pigments in the skin and mingle with the blood, spreading throughout the body when applied topically. The movement of the body's soft tissues decreases mental and physical strain, relieves bodily aches, increases blood circulation, and assures the regeneration of the person's health by remaining in balance (Kurt and Çankaya, 2021).

Aromatherapy essential oils have a wide range of applications. Disposable lavender and rose-scented masks were produced in a study to

alleviate work stress and lessen the shielding possibilities of dangers such as viruses, so that employees may relax with aromatherapy (Kodaloğlu, 2021). Many favorable impacts on emotional state have been discovered in the scenting of essential oils, in addition to its positive effects on soothing, strengthening the defense system, relaxation, anxiety reduction, and improving concentration. It also influences symptoms including blood pressure, respiration rate, and pulse rate (Öz, 2022). In the treatment of nausea and vomiting in a chemotherapy patient, the use of peppermint and ginger oils greatly comforted the patient and lowered significantly (Ertürk and Taşçı, 2021). According to a study on athletes, apricot, lavender, and St. John's Wort oils should be used in the massage method to improve sleep quality by reducing recovery time after exercise, and lavender oil is more effective than apricot and St. John's Wort oil (Bayer, 2021). According to Kim et al. (2005)'s study on rheumatoid arthritis patients, when we look at the results of the aromatherapy method, which is made with a 1.5% mixture of lavender, marjoram, eucalyptus, rosemary, and peppermint essential oils and almond, apricot, and yoyoba carrier oils, the pain in patients was reduced. It has been found to alleviate symptoms such as weariness, depression, and difficulties moving (Metin and Özdemir, 2016). Separate aromatherapy is frequently used in clinic to treat symptoms such as pain, nausea vomiting, stress, anxiety, depression, sleep issues, and infection in patients with various disorders (Farahani et al., 2019; Lua et al., 2015). Aromatherapy favors essential oils such as lavender oil, rose oil, bergamot oil, and peppermint oil (Huang et al., 2021).

As the use of integrative medical applications such as aromatherapy grows, it is expected that people who lack health understanding will utilize these applications, which will have detrimental repercussions for people. Nurses who are responsible for providing holistic treatment should be given the opportunity to conduct aromatherapy by acquiring the relevant training (Baltacı and Tülek Deniz, 2019). It is critical to evaluate the dose of aromatic oils used and their effects on the patient. Aromatherapy and other complementary applications must be carried out under the supervision of qualified health professionals.

## **1. Aromatherapy in Pain Management**

With the publication of the "Regulations on Traditional and Complementary Medicine Practices" in our country in 2014, aromatherapy became a legally prescribed treatment to be used by physicians and dentists (Anonymous, 2023b). The same regulation includes articles governing aromatherapy training. Aromatherapy using essential oils can promote both physical and emotional well-being by lowering stress and anxiety and increasing mood. It is known to have impacts on inflammation, chronic pain, sleep, and anxiety, in addition to lowering psychosocial symptoms (Styles, 1987; Dunn et al., 1994; Shannon, 2002; Brachtesende, 2005; Lin et al., 2007; American Occupational Therapy Association, 2008; Haltiwagner et al., 2009). It is found to be beneficial in treating pain by activating the neurological system and reducing muscle spasms, resulting in the regression of hypoxia and the release of pain-inducing chemicals such as serotonin and endorphin (Konvicka et al., 2008). Aromatherapy essential oils also raise lymphocyte levels, particularly the amount of B-lymphocytes, which has a good influence on the immune system (Akeren and Hintistan, 2021). Aromatherapy treatments with lavender, *Damascus rose*, citrus, sage, chamomile, mint, dill, orange, and ginger oils and extracts have been shown to reduce pain associated with symptoms such as post-cesarean section surgery pain, anxiety, nausea-vomiting, and abdominal bloating (Karaçam et al., 2022). Ten drops of lavender oil were poured into a glass of water every evening for three months and supplied orally to 154 individuals in the initial headache research. In the second research, participants were instructed to inhale the oil for 15 minutes by dabbing 2-3 drops of lavender oil on their upper lip. When the efficacy of lavender oil in headache management was assessed, it was discovered that it considerably reduced headache in both tests and was beneficial in reducing the frequency and intensity of headaches in patients (Sert and Özer, 2022).

In their investigation on 24 patients to investigate the effect of aromatherapy on itching in hemodialysis patients, Shahgholian et al. (2010) blended peppermint, lavender, and tea tree oils and diluted them with sweet almond oil to make a 5% solution. At the end of the two-week aromatherapy application, they discovered that the itching scores of the patients in the experimental group had decreased, and the difference was statistically significant.

Patients were divided into four groups in a study examining the effects of aromatherapy on the symptoms and quality of life experienced by breast cancer patients. The first group was treated with only aromatic scents, the second with aromatic scents and massage, the third with massage only, and the fourth with nothing. According to the findings of the study, the groups that received aromatic fragrances and massage, as well as the group that merely applied aromatic smells, had the highest quality of life, while the control group had more significant physical and psychological symptoms than the other groups (Ovayolu et al., 2014).

Aromatherapy is a non-pharmacological approach used in burn victims that involves the therapeutic use of aromatic essential oils extracted from plants for physical and psychological well-being (van Dijk et al., 2018; Rafii et al., 2020).

The quality of the essential oil used in aromatherapy applications is critical in order to achieve the intended effect. Quality requirements include the process of manufacture, quality control, packaging, labeling, and storage of the essential oil. Analyses of the essential oil to be used should be undertaken in certified laboratories, and the results should show that the content meets the pharmacopoeia criteria. The dose of essential oil used in the applications varies depending on the person's age, prior diseases, allergy statement, and the area of the body to be administered. As a result, it is critical that the employees who will complete the application are educated and skilled in this subject.

Aromatherapy is a treatment approach utilized by health professionals such as midwives, nurses, physiotherapists, and physicians, according to legal rules in countries such as Germany, Austria, and Belgium where phytotherapy and aromatherapy applications are frequently and efficiently used. The medical chambers in these countries control the course hours and content of aromatherapy courses for healthcare workers. However, several courses allow persons other than health professionals to gain the title of aromatherapist. Participants who pass these courses and earn the designation of aromatherapist, on the other hand, can only give limited suggestions for cosmetic applications, some massage applications, and basic symptoms. Participants in advanced aromatherapy trainings in European countries receive far more detailed training in anatomy, physiology, taking anamnesis from the patient, essential oil interaction with medicines, and side effects. Aromatherapy applications that



aromatherapists who complete this training can use without consulting a physician are, however, limited (Steflitsch and Steflitsch, 2007; Price and Price, 2007; Gültekin, 2020).

When used intelligently, aromatherapy is a safe and harmless supportive therapeutic tool. It should be noted, however, that the essential oils employed in aromatherapy might interact with the actual therapies and medications. However, in the treatment of certain disorders, it should not be used alone without abandoning the primary treatment and without the supervision of a specialist (Genç, 2010).

## **5.4. MANIPULATIVE (BODY BASED) METHODS**

### **A) Massage**

Massage is one of the world's oldest known and practiced GTAT procedures, and it is a GTAT method used to alleviate muscle tension, accelerate blood flow in the tissues, and offer a soothing effect. Massage can be utilized for scar tissue disintegration and removal, muscle spasm, revascularization, myositis, fibrositis, sprain, insomnia, neurasthenia, hypertension-related headache, migraine, constipation, uncomfortable menstruation, and obesity. Massage is not recommended for people who are at high risk of developing soft tissue, skin, or joint problems, venous thrombus or embolism, coagulation disorders, fractures, end-stage osteoporosis, pressure ulcers, or patients with severe varicose veins, such as cellulitis, phlebitis, or abscess (Çetin and Bülbül, 2015).

Per Henrik Ling (1776-1839) developed current manual scientific massage techniques like as petrissage, efflorescence, vibration, and trcision as a result of this. Following the development of these techniques, mechanical massage equipment comparable to pneumatic compression devices were created. The massage publication of the French Estroderedu, which is regarded as the origin of contemporary massage, was revealed in 1863, and it was categorised based on the bodily system it influenced, owing to this scientific investigation. With the advent of the pharmacological age in 1940, it lost favor as a primary therapeutic strategy in health care.

Aside from manual back massage, nurses now use alternative and supportive therapies such as therapeutic touch, reflexology, and aromatherapy

(Çetin & Bülbül, 2015). Massage is a GTAT method used in atraumatic care practices to relieve stressors and provide a sense of control in children. It facilitates the newborn's acclimatization to the surroundings after birth and assists families in the early stages of baby care. It gives relief for the baby in a variety of scenarios, including pain reduction, sleep problem resolution, teething, and gas problems. It has been observed in premature babies that it reduces stress, provides sleep patterns, shortens hospitalization time, is effective in reducing postpartum depression and pain after invasive procedures in mothers, increases serotonin levels in babies, and has a calming effect on stress hormones (Oran and Arslan, 2019). Massage has been utilized in several cultures to protect health and treat ailments because it builds newborns' bonds with their mothers and promotes psychosocial and physical development (Parlak, 2010).

According to studies conducted by the Touch Research Institute (TRI), babies that are massaged for fifteen minutes three times a week grow 47% more weight (Dinçer et al., 2011). When we looked at the traditional methods used by mothers (n:245) with babies aged 1 to 12 months in two distinct regions of Turkey, 37% of the moms reported using olive oil massage to relieve abdominal pain (Çiftçi and Samur, 2017).

Uysal et al. (2017) investigated the factors affecting infants with infantile alcoholism, and it was discovered that 25.8% of the mothers exercised exercise with massage in a questionnaire form administered to the mothers of 209 children. O'Flaherty et al. (2012) discovered that aromatherapy massage promoted relaxation in children with burns, with 92.8% of children responding favourably to massage and the baby falling asleep. According to Aşilar and Bekar (2018), 54.6% of mothers with 0-24 month old children are constipated; 28% said that they give apricot, apple, peach, compote and breastfeed frequently and give massage; 43.3% said that when gas pains and stomach ache; stated that they would massage his stomach, back, waist, and feet.

More research should be conducted on GTAT approaches, which have only recently gained traction in our nation and around the world. Nurses, as health professionals, must be equipped with the information and tools to teach or apply to parents developmentally and physiologically erroneous GTAT practices or good GTAT practices. The research survey aims to examine the degree of information provided to parents by examining the knowledge and

attitudes of nurses working in the pediatric clinic concerning traditional complementary alternative approaches. It is critical to avoid potentially harmful activities when it comes to maintaining and developing one's health.

## **B) Chiropractic**

Daniel David Palmer (DD. Palmer) (Mangan, 2017) is the person who founded chiropractic science. He was born in Canada in 1845 and came to the United States (USA). Chiropractic is a method that evaluates the functioning of the nerve system and its effect on overall health, in the detection, treatment, and prevention of musculoskeletal problems (Akalin et al., 2023). "Chiropractic correction" (literally, passive mechanical movement of a specific spinal joint by hand, or "spinal manipulation" in the medical literature) was used historically by Hippocrates, Galen, and Ambroise Paré (Micozzi, 2018; Puentedura, 2018).

Chiropractic correction is administered to the affected spinal segment (particular contact point), and a high-speed and low-amplitude (HVLA) pressing motion with a short lever arm is performed. HVLA adjustments are often completed in a fraction of a second or less. This duration can be lowered to 1/32 of a second using the activator instrument (Herzog, 2010)

Chiropractic goes beyond the physiological limit of the injured joint and attempts to heal it through manipulation (Özcan et al., 2021). Chiropractic spinal manipulation therapy uses a hand or tool that requires force to regulate spine functions and alleviate pain in the musculoskeletal system. This approach is commonly used to alleviate back, neck, waist, and headache pain (Özden et al., 2022).

The chiropractic treatment method, which has been taught as a graduate program under the auspices of "Bahçeşehir University Graduate Institute" since 2015, continues to contribute to public health by providing a different perspective to our country's medical doctors and physiotherapists (Ağaoğlu et al., 2018). According to a study on the job analysis of chiropractors, 98% of the professionals supported, informed, and provided advice to the individuals who applied to them regarding physical activity and ergonomics (Coulter and Shekelle, 2005). Chiropractic, as a health care provider, is a legally recognized profession. Official university degrees have been developed, and legislation

governing the chiropractic profession are in place in many countries around the world. There are roughly 90.000 chiropractors worldwide, with 65.000 of them based in the United States. Every year, around 30 million people in the United States seek the services of a chiropractor (Micozzi, 2018).

Although it was once thought that any disease experienced by an individual was caused by a single misaligned spinal vertebra, many people now believe that a patient-centered care model that focuses on the individual's holistic health, wellness, and quality of life is a more appropriate model for chiropractic principles and principles (Gliedt et al., 2017; Palmer, 1920; Senzon, 2018). The chiropractic HVLA (high-speed low amplitude) manipulation is a "high speed low amplitude" push movement that is performed manually. Using the short lever arm, it is applied to the exact contact point on the relevant spinal segment within the limitations of anatomical joint mobility. It regulates appropriate articular connection and function, decreases mechanical stress, and impacts neurological integrity and physiological processes by causing joint distraction and cavitation (LaPelusa and Bordoni, 2022).

High-speed, low-amplitude spinal manipulations, which are commonly utilized in chiropractic treatment, have also been shown in studies to reduce pain severity and promote functionality, particularly in persons with chronic low back pain (Goertz et al., 2016). Despite the fact that both biomechanical and neurophysiological phenomena are thought to play a role in the observed clinical effects of spinal manipulation, a growing number of recent studies have demonstrated peripheral, spinal, and supraspinal manipulation mechanisms and demonstrated that improved clinical outcomes are largely of neurophysiological origin (Gyer et al., 2019).

Dr. Mustafa Ağaoğlu received chiropractic treatment from the individual attempting to bring chiropractic care to Turkey. Dr. Ağaoğlu, who received his chiropractic training in the United States, completed the appropriate permits and processes in 2005 and brought the profession to Turkey. Dr. Ağaoğlu (Mangan, 2017) established Turkish Chiropractic Spine Health Association in 2007. Chiropractors are one of the leading contact health practitioners in the United Kingdom. This circumstance has prepared the way for chiropractors to diagnose and treat patients, and to practice without the assistance of other health professionals when necessary, in order to fulfill their role in health care (Jones-Harris, 2010).

Chiropractic examinations encompass general and specialized diagnostic methods such as skeletal system imaging, laboratory tests, orthopedic and neurological evaluations, and observation and touch assessments. Spinal correction and other manual therapies, rehabilitative exercises, supportive and helpful measures, and patient education/counselling are all part of patient care. Chiropractic is a form of alternative medicine that focuses on the conservative treatment of the neuromuscular and skeletal systems without the use of medicines or surgery. Chiropractors, on the other hand, use non-invasive manual therapy approaches (LeFebvre et al., 2012).

Chiropractic diagnostic approaches include laboratory tests, orthopedic and touch assessment evaluations, and observation and assessmentskeletal system imaging. Spinal correction and other manual therapies involve rehabilitative exercises, supportive and helpful measures, and patient education/counseling. Chiropractic is a type of alternative medicine that focuses on the non-surgical treatment of the neuromuscular and skeletal systems. Chiropractors, on the other hand, employ non-invasive manual therapies.

High Velocity Low Amplitude (HVLA) manipulation techniques using long-arm or short-arm advantage techniques are used in chiropractic treatment to move the spine and/or neighboring joints that have lost their natural physiological mobility from active and passive ranges of motion to paraphysiological zones. Chiropractic manipulations are indicated for many musculoskeletal problems, particularly in the lower back, neck, back, thorax, and extremities, unless contraindicated for manipulative treatments, as shown in Table 12, where these techniques can be beneficial but do not cause any harm (Bergmann et al., 2011). Subluxations, which are structural and functional changes characterized by discomfort, muscular hypersensitivity, and restricted joint movement, are also treated by chiropractors. Symptoms of subluxations include muscular tightness and alterations in ligament components. Chiropractors also address fixation issues, or the inability of joints to move for an extended period. Chiropractic care is generally utilized for musculoskeletal issues. According to the American Chiropractic Association, chiropractic care is not restricted to back pain, neck pain, or other neuromuscular skeletal issues; 11-19% of patients had conditions other than musculoskeletal diseases.

However, outside of the United States, this rate is extremely low (Yıldız and Ağaoğlu, 2013).

**Table 12.** Indications for Chiropractic Manipulations

- 1 Mechanical and functional pain
- 2 Hypomobility in the joint iii.
- 3 Normal joint range of motion
- 4 Vertebral axis disorders (subluxation)
- 5 Soft tissue pain in extremities
- 6 Cervicogenic headache (spondylogenic syndrome)
- 7 Pseudoradicular pains (piriformis syndrome, etc.)
- 8 Somatic dysfunction
- 9 Intervertebral disc herniation (in some cases)
- 10 Facet syndrome
- 11 Sacroiliac joint dysfunction
- 12 Myofascial pain and dysfunctions due to postural and mechanical stress

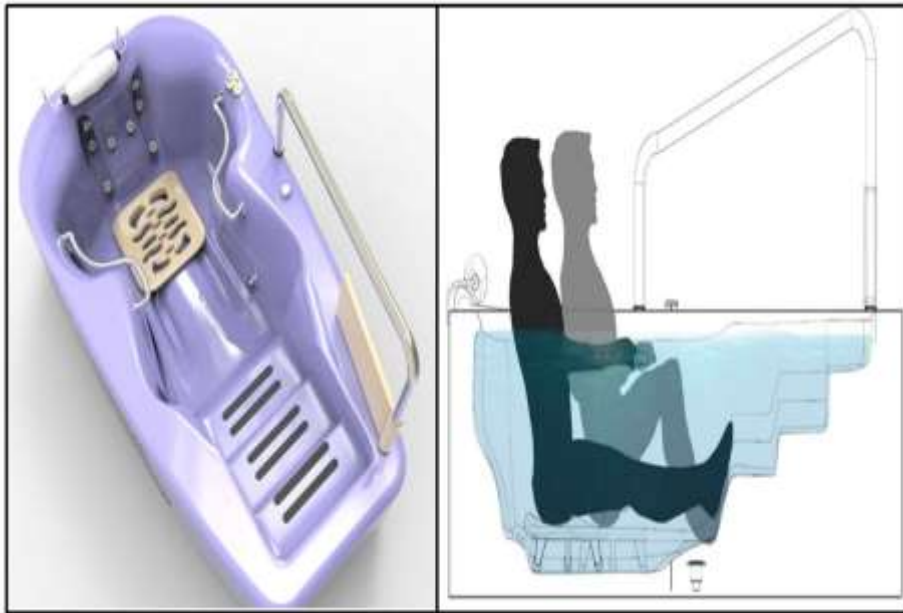
According to a study on the job analysis of chiropractors, 98% of the professionals supported, informed, and provided advice to the individuals who applied to them regarding physical activity and ergonomics (Coulter and Shekelle, 2005). A Chiropractor examines the spine for aberrant movement, pain, and tension in vertebral motion segments. The Chiropractor refers to these vertebral motion segment anomalies as vertebral subluxations. Following the examination, the Chiropractor applies a high-velocity low-amplitude (HVLA) quick but regulated push to the spinal joint and corrects the spinal joints that are deemed to have aberrant movement or function. This is referred to as a chiropractic adjustment or spinal manipulation (Navid, 2020).

### **C) Hydrotherapy**

Hydrotherapy is a therapeutic approach used to improve the neuromusculoskeletal system and functions in a pool built for treatment, in collaboration with an educated person who is knowledgeable about the treatment, which is tailored to each individual. The three states of water are

used in hot and cold applications as liquid ice and steam (Karagülle, 2008). The burden on the muscles and joints is reduced by utilising the physical qualities of water (Yiğitbaşı and Yurcu, 2021). It is employed in hydrotherapy by taking into account water parameters such as viscosity, hydrostatic pressure, external applications, and temperature (Çolak, 2021). It has positive effects in many areas such as musculoskeletal, respiratory, circulation and body weight control (Akgün, 2021). The pool used in hydrotherapy treatment is operated; the desired temperature and amount of water is added to the part with the water enclosure. The individual sits on the seat and places his feet on the step. It gains strength by gripping the handles on both sides. It exercises its arms and legs by moving itself forward and backward with the seat component (Azeloğlu and Alper, 2019).

The pool used in hydrotherapy treatment is operated; the desired temperature and amount of water is added to the part with the water enclosure. The individual sits on the seat and places his feet on the step. It gains strength by gripping the handles on both sides. It exercises its arms and legs by moving itself forward and backward with the seat component. Figure 15 depicts the use of a pool and hydrotherapy exercise equipment in the treatment of hydrotherapy. The therapeutic effects of hydrotherapy are related to hydrodynamic concepts such as buoyancy, hydrostatic pressure, and water viscosity (Ellapen et al., 2018).



**Figure 15.** Conceptual Design of Hydrotherapy Exercise Device

One of the non-pharmacological approaches used to lessen labor pain, soothe the pregnant woman, and relax the perineum and pelvic muscles during labor is hydrotherapy (Neiman, 2019). Water is very soothing during the birthing process. Water temperature and pressure are critical components in the therapeutic action. Blood flow is spread throughout the body when arteries dilate, and blood pressure falls. With slurring, uterine oxygenation and fetal well-being rise (Gökşen et al., 2022). Reduced chance of tear at birth, mother stress hormones adrenaline and norepinephrine decrease, ensuring oxytocin release and oxygen supply continuity (Uzunlar et al., 2017). When research on the effects of hydrotherapy on the labor process are analyzed, it is indicated that the hydrotherapy method used during the birthing process has significant impacts on reducing pregnant women's anxiety and giving them with comfort. Furthermore, the hydrotherapy approach aids in increasing uterine perfusion by decreasing vasopressin levels, reducing painful contractions, and shortening the delivery period (Aktaş et al., 2019).

Acoustic rehabilitation is now recognized as an important component of Physical Therapy and Rehabilitation all over the world, with centers developed.



Table 13 lists the scenarios that are desired to occur in the therapy server in the hydrotherapy pool (Öztürk, 2010).

**Table 13.** Targets in the Outcomes of the Treatment Applied in the Pool

|                              |   |
|------------------------------|---|
| Improve sensory arousal      | Improve relaxation                                  |
| Reducing muscle spasticity   | Increase range of motion                            |
| Facilitating co-contraction  | Increasing vital capacity                           |
| To inhibit hypertonia        | Teaching to walk                                    |
| Increase muscle strength     | Reducing the compression forces acting on the joint |
| Advancing a sense of control | Making the motion experience fun, successful        |
| Improve self-sufficiency     | Increase stamina                                    |

Hydrotherapy improves blood circulation, lowers edema, relaxes muscles, relieves pain, and is a natural therapy that warms the body. Some of the research include the effectiveness of hydrotherapy in lowering blood pressure in the elderly, the effect of foot soak hydrotherapy on lowering blood pressure in hypertension patients, and the effect of hydrotherapy on increasing bodily balance (Pramithasari et al., 2021). It significantly decreases hypertension in the elderly with hypertension thanks to hydrotherapy (Dilianti et al., 2017). Hydrotherapy is another non-pharmacological therapeutic option that can help non-hemorrhagic stroke patients. It is the use of water to heal and relieve a variety of ailments, including boosting muscle strength (Setiyawan et al., 2019). Hydrotherapy both soothes and stimulates the athlete's mind. Furthermore, the residence period must be limited (Jeffreys, 2005). It is used to treat pain, chronic obstructive pulmonary disease, asthma, Parkinsonism, ankylosing spondylitis, rheumatoid arthritis, knee osteoarthritis, fibromyalgia, anorectal disorders, fatigue, anxiety, obesity, hypercholesterolemia, and hyperthermia (Mooventhana and Nivethitha, 2014).

Hydrotherapy method is performed in two different ways. The first of these methods is the pool method, and the other method is the shower method. In the shower method, the water varies between 32°C and 42°C at body temperature or slightly above body temperature. It is reported that hydrotherapy

is applied to a part of the body or to the whole body during labor, reducing the pain to a minimum level thanks to the thermoreceptors in the body, and stimulating the reflexes that occur in the pregnant woman, thereby helping to reduce the anxiety in the pregnant woman and to have a comfortable delivery (Mallen-Perez et al., 2018).

#### **D) Osteopatik Terapi**

Andrew Taylor Still established the first osteopathic medical school in 1892. The foundation of osteopathic medicine is the notion of self-healing, which is the body's intrinsic power. Today, osteopathic medicine is considered general medicine; its philosophy blends existing surgical and obstetric applications with the needs of the patient to create a comprehensive medical care system. His interest in patient care is centered on the relationship between the structure and function of the body, as well as its ability to heal itself (Seffinger et al., 2002). Osteopathic manual therapy is also concerned with the full person, including mind, body, and soul. The impact of mental health on physiological processes and vice versa is a functioning psychosomatic in and of itself (DiGiovanna et al., 2005).

Osteopathic treatment is a method that involves diagnosis as well as treatment ways to improve the homeostasis mechanism and its functional and structural relationship. It is used to supplement traditional treatment for musculoskeletal system problems. It is a system that alleviates musculoskeletal pain, regulates defective bodily systems, and enhances the respiratory process (Altnbilek, 2019). OMT's therapeutic application is focused on somatic dysfunctions that influence respiratory mechanics, circulation, and fluid flow. Many of the approaches utilized in this paradigm are intended to improve homeostatic mechanisms related with the lymphatic system and are usually referred to as "lymphatic techniques" despite the fact that they have various purposes and mechanisms (Association, 2010). It is mostly used to treat people suffering from knee, hip, shoulder, and neck discomfort. According to one study, secretory IgA levels rise in persons who are under psychological or emotional stress, therefore touching the patient has beneficial benefits on the immunological, neurological, and endocrine systems. Even gentle touches, comparable to the osteopathic treatment provided twice a month in nursing

homes, have been shown to lessen the likelihood of drug usage (Yıldız et al., 2013).

Practitioners in osteopathic medicine use acknowledged methods of physical and surgical diagnosis and treatment, which include further training in the evaluation and treatment of the neuromusculoskeletal system to achieve normal body mechanics (DiGiovanna et al., 1997). Furthermore, osteopathy is a treatment strategy used to alleviate pain and functional abnormalities caused by emotional or physical effects on physiological difficulties in organs and joints (Yaraşır et al., 2018).

Osteopathic manual therapy (OMT) is a method of evaluating the entire body, improving homeostatic systems, and incorporating diagnostic and therapeutic procedures to enhance structure and function correlations. OMT enhances respiratory mechanics, venous and lymphatic drainage, promotes homeostasis, and optimizes functioning (Earley and Luce, 2010; Kuchera, 2007). OMT is a broad approach to disease prevention and treatment that is based on some fundamental concepts of diagnosis and treatment. The body is a dynamic and functional unit. Health is influenced by the health of one's body, mind, and soul. The human body possesses self-regulating mechanisms and is self-healing by nature (Licciardone et al., 2013).

Osteopathic practitioners include soft tissue and joints in their practice areas, in addition to spinal manipulation, when completing therapy sessions. While chiropractic and osteopathic medicine practitioners employ fast, short motions (high speed and low intensity) to execute articular methods, Osteopathic manipulation also uses the spine and surrounding tissues that support the joint to give improved mobility (Brolinson et al., 2008). High velocity, low amplitude, and medium velocity, medium amplitude manual techniques, spinal manipulation, soft tissue stretching, rolling and pressure techniques, myofascial stretching and release techniques, myofascial sore spot therapy, positional therapy, muscle energy techniques, and visceral techniques are all part of OMT (Franke et al., 2014).

In a study to see if osteopathic treatment might improve perceived pain and disability in adults with neck discomfort, 17 patients (7 men and 10 women) were enrolled. The subjects were given osteopathic treatment for four weeks. The patients' impairment and pain levels were shown to be greatly reduced (Fryer et al., 2005). OMT is commonly used in athletes for two reasons. If the

athlete's performance is hampered by a painful condition, manipulation is employed as part of a partial or holistic strategy to treating the symptom. The other strategy is to improve the athlete's performance immediately following therapy and rehabilitation (Crow, 2000).

### **E) Therapeutic Touch**

Krieger and Kunz created the therapeutic touch application in 1972 (Krieger, 2002). Physical touch, which has an emotional self that we apply willingly or unwillingly in our daily lives, begins with fertilization and continues throughout life. Communication becomes an easy, honest, direct, and positive action with the physical touch application, which has a favorable effect on the individual (Turan, 2015). Therapeutic touch is a complementary and integrative therapy used with compassion to restore people's inner equilibrium (Erenoğlu, 2015). Therapeutic touch has been shown to improve physical health by boosting hematocrit and hemoglobin levels, as well as decreasing heart rate and blood pressure levels. These neurobiological distinctions are thus advantageous in terms of coping with discomfort, anxiety, pain, agitation, and other negative symptoms, as well as sustaining a positive mood in the body and brain (Bilge et al., 2016) When the literature and data collected by Akçakoca (2020) from a total of 15 students, eight boys and seven girls, were examined, significant decreases in attention deficit, oppositional behavior changes, and hyperactivity were observed. Because of these findings, it was hypothesized that developmental contact treatment could benefit children with ADHD.

Energy treatment is used in therapeutic touch. It is concerned with the electromagnetic and energetic fields of the body that exist outside of the body (Vitale, 2007). Nurses, who have the most opportunities to engage with patients, can help patients experience less dread, anxiety, and loss of control by giving a strong therapeutic effect through therapeutic touch (Mollaoğlu, 2001). Therapeutic touch is a holistic technique to regulating, increasing, balancing, and safeguarding energy fields with the hands in order to heal diseases or symptoms produced by an imbalance in critical energy fields. Therapeutic touch, which is thought to have healing and soothing properties, is one of the alternative treatments that tries to help individuals and has grown in popularity and use among nurses in recent years (Aghabati et al., 2010). In induced trauma quadriplegia, post-mastectomy pain, skin cancer and cystic lung tissue,

arthritis, tendovagenitis, and advanced asthma, therapeutic touch is frequently chosen (Cox and Hayes, 1997). In patients, therapeutic touch has the capacity to induce physiological calm. The degree of anxiety dropped visibly in a quasi-experimental study done to investigate the effect of therapeutic touch on anxiety in patients hospitalized in the cardiology clinic (Heidt, 1981). The practice of controlling, persuading, balancing, and safeguarding energy fields with and without touching the hands has been termed as therapeutic touch (Turan, 2015).

After comparing the effects of therapeutic touch on the behavioral states of preterm newborns, it was discovered that therapeutic touch considerably increased the babies' sleep time and helped them stay calmer (Im et al., 2009). The following are some of the advantages that therapeutic touch can bring to intensive care unit patients (Tovar, 1991; Mollaolu, 2001):

a) When the patient is touched, he or she relaxes, and aspects such as breathing and blood pressure improve.

b) Therapeutic touch will improve patients' consciousness and boost their knowledge and comprehension skills.

c) Through therapeutic touch, patients' mental issues such as depression, anxiety, and fear will be reduced, while touch will relieve patients' pain.

d) Medical treatment will have a more positive physical and psychological impact on patients.

e) Patients' calming needs will be reduced because of touching before surgical procedures.

f) It keeps patients connected to reality by allowing them to grasp their own predicament.

## **5.5. ENERGY TREATMENTS**

### **A) Reflexology (Acupuncture)**

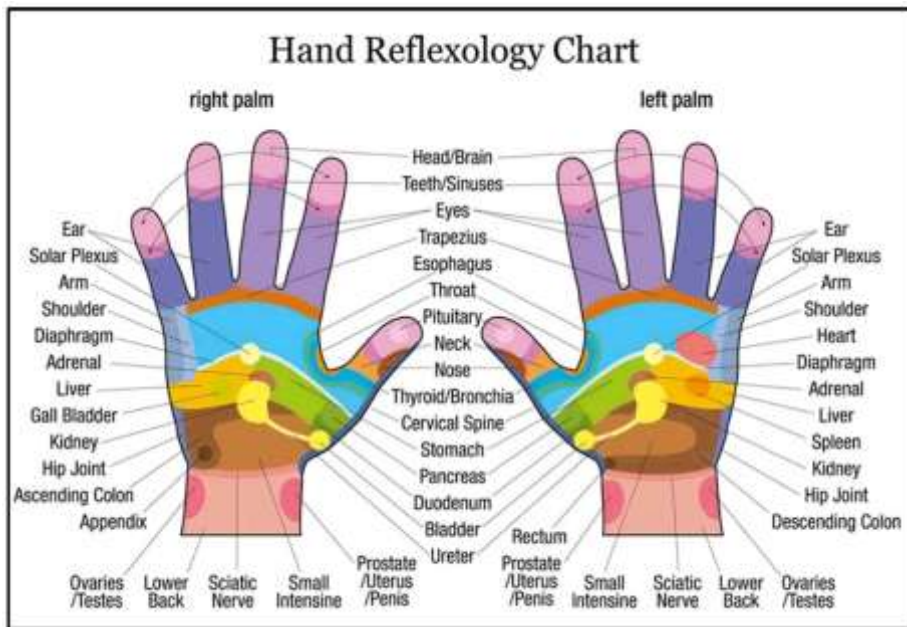
It is defined as "a method that helps to normalize the functioning of the body, applied by touching the reflex points on the hands, feet, and ears, which are associated with all organs, parts of the body, and glands in the body" by the Institute of Reflexology. It has been utilized for hundreds of years in an attempt to balance the energy of the body in order to improve relaxation by allowing the body to heal (Bolsoy and Okuyan, 2019). Contact is also suggested to cause distraction and relaxation (Uysal and Kutlutürkani, 2016). It is utilized in

neurological, musculoskeletal, digestive system, autoimmune illnesses, palliative care, and psychiatric patients to improve their health and well-being (Çuvadar, 2022). In reflexology, a reflex is an involuntary muscle contraction caused by external stimuli (Kurt and Can, 2013). Regional treatment and reflex massage therapy are other names for reflexology. Its basic premise is that each area of the hands and feet represents a different part of the body, such as the heart, liver, spleen, lungs, kidneys, and other internal organs, and that massage can stimulate energy, blood, nutrition, or nerves, resulting in therapeutic effects such as relieving mental stress, detoxifying the body, promoting blood circulation, losing weight, delaying aging, and improving internal health, as demonstrated in Figures. When we talk about reaction zones in the feet, we mean the places on the soles of all the feet. When we study the reflex zones in the feet, we can see that the spots on the soles of all organs in the body are the same as in our body; that is, when the two feet join, the image of the human body is generated as shown in Figure 16. This is a road map for using reflexology. Using pressure on the organ points on the feet, hands, and ears, it is possible to treat the entire body (Yüksel, 2021). There are many nerve endings in the feet in reflexology, and because they are particularly sensitive, massage is frequently done on the feet (Kurt and Can, 2013).



**Figure 16.** Reflexology zones on the feet

In Figure 17, the reflexology centers and their relations with the organs are given (Anonymous, 20231).



**Figure 17.** Reflexology centers on hand

By inducing relaxation, reflexology is also believed to promote blood flow, quiet the mind, boost immunity, and relieve stress. According to studies, reflexology has a favorable effect on lowering symptoms such as pain and exhaustion and improving the quality of life of rheumatoid arthritis sufferers (Tülüce and Şevenk, 2021).

According to the studies performed by reflexology, after treatment;

1. It reduces the severity of the disease in patients with rheumatoid arthritis
2. It increases relaxation by reducing pain in MS patients.
3. Reduces cortisol levels in postpartum women
4. It reduces heart rate, respiration, blood pressure in intensive care patients receiving external oxygen support.
5. Found to reduce pain in CA patients (Doğru et al., 2017).

A study on the effect of reflexology on radiation found a favorable effect on fatigue, sleep state, and discomfort during radiation therapy in 72 female breast cancer patients (Büyükbayram and Ayık, 2021).

Acupuncture is a 3000-year-old Traditional Chinese Medicine treatment. The term acupuncture is derived from the Latin words 'acus' (needle) and



'puncture' (to penetrate). Qi, or life energy, circulates in the body's energy channels known as meridians. The flow of Qi energy in the body can be influenced by stimulating the acupuncture sites located on these meridians and opening to the skin with a needle. Acupuncture is a type of treatment that helps the body to heal itself by restoring the body's energy balance. Acupuncture has lately been reported in the literature to be able to modulate microcirculation. Acupuncture has been demonstrated in previous research to be beneficial for symptoms such as exhaustion, discomfort, and sleeplessness (Çayır et al., 2018). In the "Traditional and Complementary Medicine Regulation" published in the Official Gazette dated 27.10.2014 and numbered 29158, acupuncture includes: "Needle, laser beams, electrical stimulation, cup, in-ear seed, needle or magnetic balls, thermal stimulation, acupressure and sound or by stimulating special points in the body with stimulation methods such as electrical or magnetic vibrations" is defined as (Anonymous, 2023c).

Traditional treatment aims to assist treatment, treat, improve life standards, eliminate drug adverse effects, prevent the formation and recurrence of cancer, and relieve stress and anxiety. Among these treatments, acupuncture may be preferred to provide physical and psychological support to the individual (Cihan, 2020). The human body is capable of self-repair. There are some "acupuncture points" in our bodies that activate this capacity (Kavaklı, 2010). Acupuncture is performed by putting small needles into certain spots on the body. The goal is to stimulate certain places in the body and balance the flow of energy. As a result, it improves the immune system and can cure the disease without the need of drugs, and its most well known benefit is pain relief. Dopamine and serotonin levels rise in the brain. By increasing the volume of blood flow locally, the regeneration impact is increased and the cell is replenished. It also maintains homeostasis balance (Cihan, 2020).

The goal of acupuncture practitioners is to maintain a balance between the body's harmony with both the internal and exterior environments. Acupuncture treatment practitioners assess patients from several angles using a holistic medical approach, based on the idea "there is no disease, only patients." They aim to repair problems created by the variables that cause diseases in the body and seek to treat these problems individually for each patient. The same treatment regimen may not be used in patients with the same symptom, and it may not be used in every session, even in the same patient (Capra, 2000).

Acupuncture has a strong effect on both the peripheral and central nervous systems. The nociceptive A $\delta$  (fast conducting) and C (slow-conducting) nerve fibers provide a signal to the spinal cord's dorsal horn. The communication travels to the brain stem and thalamic nucleus via the spinothalamic and spinoreticular pathways (STT and SRT). Multiple endogenous opiate neurotransmitters (endorphin, enkephalins, and dynorphin) are released when the periaqueductal gray region (PAG) and thalamus are stimulated. When the hypothalamic-pituitary-adrenal (HPA) axis is activated, it releases adrenocorticotropic hormone (ACTH), cortisol, and anti-inflammatory mediators with a variety of humoral effects. In the hypothalamus, effective neurons synapse and secrete PAG and nucleus rapin (NR), monoamines, serotonin (5-hydroxytryptamine [5-HT]), and norepinephrine. The descending routes engage inhibitory interneurons in the dorsal horn of the spinal cord's substantia gelatinosa (lamina II), resulting in the release of enkephalin or dynorphin to opioid receptors on peripheral nociceptors. Opioid receptor activation limits the release of substance P and lowers pain perception (Brown et al., 2009).

### **Acupuncture Points**

Points are denoted by "xue" (a hollow or hole) in traditional Chinese acupuncture. Each acupuncture point's name is significant and informative; yet, Chinese names for the points are rarely employed in current western acupuncture. Meridian and number rather than Chinese names identify acupuncture sites. Acupuncture points must be precisely located. Because the incorrect position of the point stops the treatment from working. The "cun" unit is used to locate acupuncture points. It is also known as the Chinese anatomical centimeter. The anatomical dimensions of the patient are employed proportionally for cun measurement, and four fingers of the hand are acknowledged as three cuns (Wolfe et al., 2010). Our body is supposed to have 26 meridians, 12 of which are bilateral major acupuncture meridians and two of which are collateral meridians placed in the anterior and posterior midline (Hecker, 2005). Needles, lasers, heat, electric current, and pressure are used to apply acupuncture points. Needles are frequently used. The primary goal of treatment is to activate the targeted location. Needles come in a variety of materials, including gold, silver, and steel. Stainless steel needles are the most

commonly used. Gold needles are utilized as stimulants, while silver needles are employed as sedatives (Horasanl et al., 2008). Female infertility is one of the areas where acupuncture has been found to have a therapeutic impact (Çayır and Gürsoy, 2018). Figure 18 depicts the image of needle acupuncture on a dog (Polat, 2020).



**Figure 18.** Needle acupuncture practice

Acupuncture has been shown in animal experiments to reduce oxidative stress, either directly or indirectly, by avoiding free radical reactions, enhancing SOD activity, and decreasing lipid peroxide levels. The central-peripheral neurohumoral pathways, protein signal transduction pathways, and self-healing processes are thought to be responsible for this impact (Zhong-ren et al., 2005). For pain in the body, there is an analgesic process in the brain given by mediators such as beta-endorphins, enkephalin, and serotonin. Acupuncture treatment stimulates free nerve endings, which causes endogenous opioids to be produced. The increased endogenous opioid concentration in the central nervous system and plasma exerts an analgesic effect by binding to opioid receptors on the surface membrane (Pomeranz et al., 1977). After needling, the stimulation of the point is strengthened or weakened by manually pushing,

pulling, rotating or both pushing and pulling the acupuncture needle to correct the Qi imbalance according to the condition of the disease (Horasanlı et al., 2008). It is thought that acupuncture is also effective on this central sensitization with its analgesic effect, descendant inhibitory effect and modification of pain sensation. In addition, it reduces inflammatory mediators with a local effect (Lai et al., 2019).

### **1. Uses of Acupuncture**

According to the World Health Organization, diseases that have been shown to be effective in controlled clinical studies and treated with acupuncture include: allergic rhinitis, biliary colic, dysentery, primary dysmenorrhea, toothache, acute epigastralgia, facial pain, headache, hypertension and hypotension, induction of labor, knee pain, leukopenia, low back pain, correction of fetal malposition, morning sickness, nausea and vomiting, neck pain, renal Acupuncture is used to treat a variety of health issues, including cardiovascular disease, neurological disease, infertility, and asthma. It is also quite helpful in providing athletes with quick relief from muscle aches and injuries after sports (Kaya and Türker, 2022). Acupuncture treatment on 59 patients who had undergone laparoscopic cholecystectomy surgery resulted in a statistically significant decrease in pain levels compared to the control group at all periods (Erden et al., 2015). 531 individuals were studied in the treatment of polycystic ovarian syndrome, and it was discovered that women with polycystic ovary syndrome who used acupuncture treatment had more regular menstrual cycles, a lower body mass index, and lower LTH levels (Qu et al., 2016). There are studies being performed to reduce the diabetes-related side effects of acupuncture. Firouzjaei et al. compared metformin monotherapy to metformin electroacupuncture combined therapy on weight loss and insulin sensitivity in obese and diabetic patients. When compared to monotherapy, the combination application significantly improves weight, body mass index, HbA1C, inflammatory cytokines, and lipid metabolism (Firouzjaei et al., 2016). Furthermore, electroacupuncture lowers insulin resistance (Kaya and Türker, 2022). Electroacupuncture used for four weeks on individuals with osteoarthritis was found to reduce pain and increase physical activity (Doan et al., 2017). Figure 19 depicts the use of electroacupuncture therapy on the upper extremity (Tekeoğlu and Tekeoğlu, 2019).



**Figure 19.** Electroacupuncture application

It has been shown that b-endorphin increases in plasma after electroacupuncture treatment and influences fat and cho metabolism, hence it has been observed that it aids in weight loss when used in conjunction with specific acupuncture points in the treatment of obesity (Cabioğlu et al., 2008). According to Leem et al., electroacupuncture used in patients with acute decompensated heart failure has a favorable efficacy in treatment and is an effective and safe method in patients (Demir and Balçık, 2022). Acupuncture can also help with smoking addiction treatment. A study of 175 patients who smoked at least one pack of cigarettes per day found that seven sessions of both body and ear laser acupuncture were beneficial in stopping smoking and improving homeostasis and health (Kaya and Türker, 2022). According to one study, when acupuncture was used on pediatric patients, it reduced the need of antiemetics by lowering nausea and vomiting. The most prevalent side effect was local redness. When used with antiemetics, it has been shown to lower the severity of nausea and vomiting (Gürcan and Turan, 2019). Acupuncture

treatment was reported to be beneficial in a recent study for Covid-19 disease symptoms such as anxiety, nausea, sleeplessness, and shortness of breath, leukopenia, stomach discomfort, abdominal bloating, and exhaustion (Ercan, 2021). Acupuncture is a type of treatment that is performed on both children and adults. Taş and Türkyılmaz (2015) found that 16 sessions of acupuncture reduced nocturnal enuresis, attention deficit, and hyperactivity in a child with attention deficit, hyperactivity disorder, and enuresis.

### **B) Tai Chi Qigong**

Tai Chi Qigong (TCQ) is a Chinese martial art that combines physical and mental training through light-to-moderate cardiovascular exercise (Wayne and Fuerst, 2013). Moving meditation exercises, also known as mind-body exercises, have gained popularity in the treatment of chronic ailments in recent years. With energy, TCQi exercise, also known as Moving Meditation, attempts to balance or rectify the individual's inconsistencies and internal complaints, the psychological states that create diseases. As a result, it teaches the individual how to live in harmony with his essence. It encompasses all of human beings' physical, psychological, mental, and spiritual components and improves their quality of life (Zou and Wang, 2017).

The mechanism of action of TCQi;

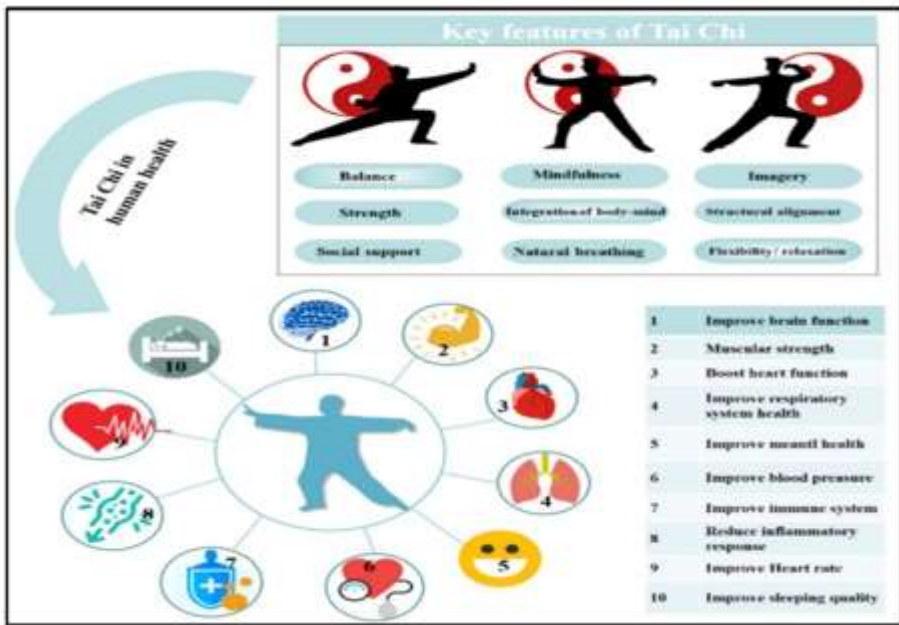
- During the exercise, the movement of all joints and muscle groups slows bone loss and strengthens bones. Thus, it improves body balance. It prevents the development of osteoarthritis and osteoporosis.

- When done at moderate intensity, it lowers blood pressure and lowers heart rate. - Deep breaths increase pulmonary capacity and blood circulation.

- Frequent and regular practice of TCQi lowers the levels of stress hormones (Yılmaz Gökmen et al., 2019).

The goal of TCQi is to help the individual's essence flow in harmony, much like in nature, and to prevent paradoxes. Many conditions, such as stress, starvation, or postural abnormalities, can cause blockages in the human body. TCQi eliminates these blocks with the Chi energy (life energy) it generates, ensuring long-term health improvement. The major goal of TCQi, which has advantages over other forms of exercise, is to balance Yin and Yang (opposites, polar energies), and so facilitate the individual's metamorphosis to his or her own essence, nature, and natural health (Weber et al., 2020).

Tai Chi, which combines mindfulness and flexibility exercises, has become a popular workout around the world-the fundamental components of Tai Chi are shown in Figure 20 (Wayne and Fuerst, 2013; Xu et al., 2021). Tai Chi has a significant value in promoting physical health and benefits practitioners with a variety of positive health outcomes such as muscular strength, aerobic capacity, balance and motor control, fall prevention, mental health, sleep disorders, fatigue, body mass index, blood pressure, heart rate, and so on (Easwaran et al., 2021).



**Figure 20.** Key features of Tai Chi and its influence on human health

The body is kept as calm as possible while performing kinetic actions, the mind follows the body, and the individual is kept in balance. This concentration allows for the release of mental control and the distraction from negative ideas (Irwin et al., 2014; Liu and Wang, 2017).

Tai Chi is already prescribed in therapeutic programs for patients suffering from diseases such as Parkinson's disease, traumatic brain injury, and multiple sclerosis, rheumatological disease (rheumatoid arthritis, ankylosing spondylitis, fibromyalgia), orthopedic disease (osteoarthritis, osteoporosis, low-back pain, musculoskeletal disorder), cardiovascular disease (acute

myocardial infarction, coronary artery bypass Exercise enhanced sleep quality and PUKI total score in a randomized controlled research with 43 participants assessing the effect of TCQi exercise training on sleep apnea and sleep quality (Kline et al., 2011).

### C) Biofeedback

Biofeedback refers to the return of physiological messages generated by the human body and recognized by the human body. It is a therapy strategy that allows the body to recognize and record normal or abnormal physiological states consciously or unconsciously using electronic devices, audio-visual signals, and control functions (Özberk, 2020). Biofeedback is used to both improve weak muscles and relax spastic muscles (Kılıçık, 2020). Biofeedback is used to modulate blood pressure, perspiration, heart rate and rhythm, temperature changes, muscle contraction, and sphincter dominance all at the same time (Uzunca, 2007). In other terms, biofeedback is the visual or auditory notification of biological facts to a human being. Sensory feedback, such as seeing or hearing, can sometimes influence learning speed. Figure 21 shows the devices used in Biofeedback (Varlı, 2014).

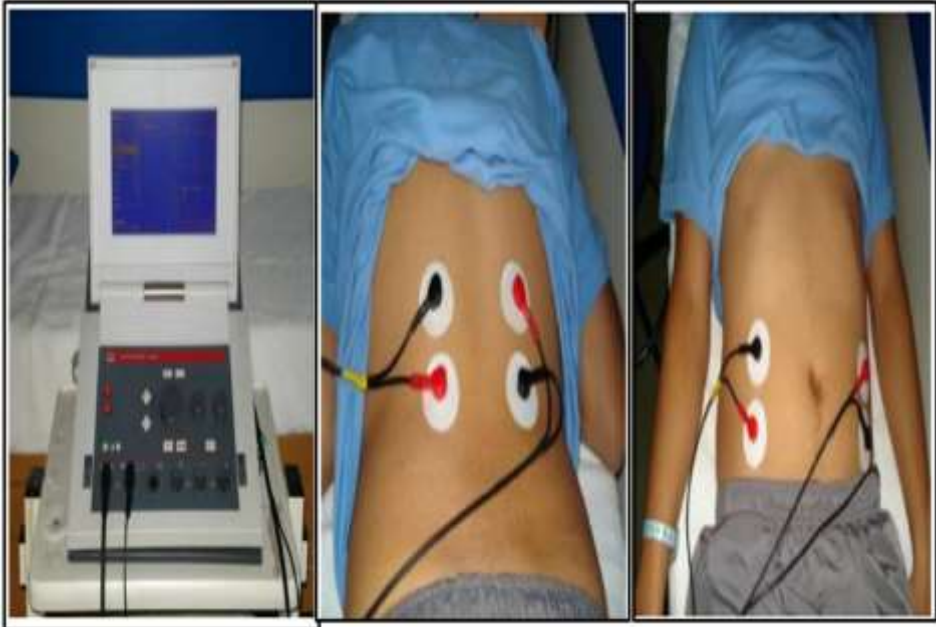


**Figure 21.** Instruments used in biofeedback



## 1. EMG Biofeedback

A treatment combines aural and visual signals from electronic devices to deliver information for all physiological events that the user is unaware of and uses this knowledge to become aware of body functions and change them willingly. The EMG Biofeedback gadget measures and records the activity of the skeletal muscle in millivolts. Figure 22 depicts the EMG Biofeedback device and the electrode connections (Karcı, 2008).



**Figure 22.** EMG Biofeedback device and electrode placement

## 2. EMG Biofeedback device and electrode placement

It is an EEG-based variation of biofeedback approaches. Within certain boundaries, this technology allows a person to observe what is going on in his own brain. Neurofeedback training teaches people how to regulate their emotions. It is also known that certain authors classify neurofeedback approaches as "brain exercise" (İşgören, 2022). Attention deficit and hyperactivity disorder (ADHD) is one of the most frequent childhood psychiatric diseases. To acquire an adequate response from neurofeedback, long-term treatment programs are provided. Today, we require more well

researched and properly created documents on neurofeedback. The therapy of neurofeedback, attention deficit and hyperactivity disorder is not indicated in the guidelines prepared for the treatment of neurofeedback, attention deficit and hyperactivity disorder (Yaylacı et al., 2019).

#### **D) Ozone Application**

Christian Schönbein, an Austrian chemist, discovered it in 1840. Its antiseptic properties were identified in 1890. Dr. Albert Wolft used it in gangrene and other comparable diseases for the first time during World War I. It was discovered that it was employed again in 1960 because of technological advancements. Ozone therapy was added to the United States (USA) Ministry of Health's supplementary medical practices in 1995 (Doğan, 2016). Ozone therapy is less expensive than alternative treatment options. Ozone therapy promotes wound healing, improves the patient's clinical condition, and reduces complications, boosting patient satisfaction (Boğaç and Ekmen, 2019).

Tendon and ligament injuries, spinal disc pathologies, neuropathic discomfort, decubitus, alopecia, dermatitis, and otitis have all been treated with ozone therapy (Kesikburun and Yaşar, 2017). When determining the ozone consumption dose, exercise caution. When administered in low levels, ozone has little effect, and when given in high doses, it produces toxication. What is true is that after starting with a low dose and gradually raising its concentration, positive outcomes should be attained without producing acute or chronic toxicity (Ünal and Sel, 2019). Ozone gas is a colorless, odorless, and highly oxidizing chemical found in the environment (İhan and Akova, 2018). Ozone is a highly effective oxidant and disinfectant (Muştu, 2019). The injection used in ozone therapy has anti-inflammatory, antioxidative activation and immunomodulation effects in the treatment of inflammatory and degenerative illnesses in the musculoskeletal system (Dıraçoğlu, 2015). It also boosts metabolism by boosting tissue oxygenation and decreasing inflammation (Kuşçu and Alkan, 2023).

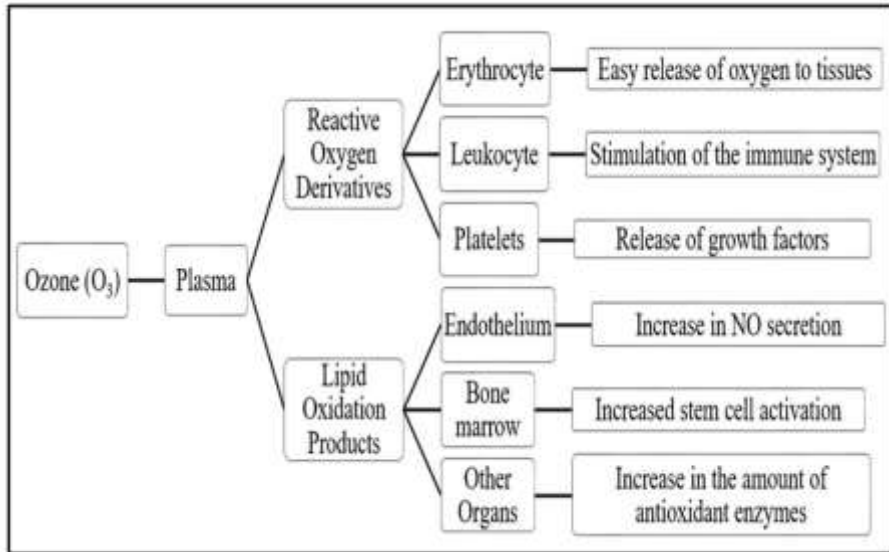
The delivery of a certain amount of oxygen/ozone mixture to the circulatory system or bodily cavities is known as ozone therapy. This mixture can be administered intravenously, intraarticularly, intrarectally, intradiscally, and topically (Bocci, 2006). In 2010, the Madrid Ozone Declaration established the ozone application dose range. Its concentration was accepted to be between

5 and 60 g/ml, and the concentrations were classified as low, medium, and high. Table 14 shows the various concentration kinds (Kavaklı and Aksu, 2021).

**Table 14.** Doses and Effect of Concentration Types

| Concentration Type | Concentration Dose ( $\mu\text{g/ml}$ ) | Effect of Concentration  |
|--------------------|---|--|
| Low                | 10-20 $\mu\text{g/ml}$                  | It is preferred in diseases in which the immune system is affected.  |
| Middle             | 20-30 $\mu\text{g/ml}$                  | It is used in lung, ophthalmological, hematological and vascular diseases.                                     |
| High               | 30-60 $\mu\text{g/ml}$                  | It is used in the treatment of infectious, dermatological, joint, allergic and systemic inflammatory diseases. |

It has been observed that ozone therapy is often utilized in the treatment of rheumatic, inflammatory, and dental illnesses, and that ozone therapy is generally recommended. Hydrogen peroxide, a reactive oxygen species is generated when the polyunsaturated fatty acids of  $\text{O}_3$  and the liquid fraction of the plasma come into contact (İkizek and Uzuntarla, 2020). Figure 23 depicts the effects of ozone therapy (Özler et al., 2019). It was discovered that 75% of the children were apprehensive before going to the dentist and that their anxiety lessened after ozone therapy, and that they came to the next session more calmly (Dähnhardt et al., 2006; Atabek, 2014).



**Figure 23.** Effects of ozone therap

The harmful effects of ozone on free radicals are demonstrated. Antioxidants such as vitamin E and vitamin C prevent the development of oxidation products. Figure 24 depicts the apparatus used in ozone therapy (Kutlubay et al., 2010).



**Figure 24.** Device used in ozone therapy

### **E) Hirudotherapy (Leech Therapy)**

It is a method used for medical purposes utilizing leeches. Hydrotherapy was employed in numerous scenarios in ancient times, including combat and wound treatment. While leeches take blood, they also inject bioactive chemicals into the tissues to which they attach. Many biological features of leeches are employed in hirudotherapy by employing medicinal variants. The most well known is that it feeds on the host's blood while secreting a variety of chemicals, including anticoagulants, anti-inflammatory agents, and anesthetics, through its saliva (Küçük and Yaman, 2019). More than 100 bioactive chemicals are found in the salivary glands of therapeutic leeches. These bioactive chemicals have analgesic, anti-edematous, and bacteriostatic properties. Leeches have these properties because they lower blood pressure, boost the immune system, prevent paralysis, and increase the permeability of damaged tissues and organs (Trak, 2019). "Hirudo medicinalis" is a type of leech employed in medieval and modern medicine to draw blood from patients. Hirudotherapy is recognized as a viable treatment option for disorders such as osteoarthritis, phlebitis, hypertension, and glaucoma (Parlakpınar and Polat, 2020). Galen (129-199) believed that bloodletting was effective in the treatment of blood, sputum, yellow and black bile imbalances in the human body. Ibn Sina employed leech therapy, which was popular during the medieval period.

All leeches in the *Hirudo* variety are used for medicinal purposes. Among the medicinal leeches; *Hirudo medicinalis*, *Hirudo verbana*, *Hirudo orientalis*, *Hirudo sukii*, *Hirudo nipponia*, *Hirudo troctina* species are among the most used (Ayhan and Mollahaliloğlu, 2018).

Areas where leech therapy is applied:

1. Acute vascular injuries in newborns
2. Postoperative acute venous congestion in the legs and penis in infants
3. Complicated vein enlargement
4. Postphlebitic syndrome
5. Anticoagulants obtained from leeches in peripheral arterial occlusion
6. Anticoagulants obtained from leeches in infectious myocarditis
7. Ecchymoses
8. Purpura fulminans
9. Periorbital hematoma and auricle hematoma

10. It can be classified as venous insufficiency developing in free tissue transfers and pedicle flap applications (Hoşnuter et al., 2003).

Figure 25 shows the state of a leech during treatment (Ünal and Erol, 2022).



**Figure 25.** Leech therapy

It is employed in medical leech treatment by putting leeches to the patient's skin or mucous membrane. The therapeutic benefits of leech saliva are obtained through the leech's suction effect from the superficial veins, the cupping effect, and the acupuncture effect by applying the treatment to the acupuncture points in the sick areas, and the amazing properties of the bioactive compounds secreted into the tissue by the leeches while sucking the blood (Kalaycı and Gödekmerdan, 2020). Table 15 shows various bioactive chemicals in leech secretion and their effects (Ünal and Erol, 2022).

**Table 15.** Bioactive substances in leech secretion and their effects

| Bioactive Substances      | Functions   |
|---------------------------|---|
| Hirudin                   | It prevents blood clotting by binding to thrombin.  |
| Calin                     | It inhibits collagen-mediated platelet-mediated platelet aggregation.                           |
| Destabilase               | It dissolves fibrin and has a thrombolytic effect.  |
| Hirustatin                | Kallikrein, triptin, chymotriptin inhibit neurophilic.  |
| Hyaluronidase             | It increases viscosity and has an antibiotic effect.  |
| Eglinler                  | It is anti-inflammatory. Inhibits the activity of A-chymotrypsin, chymase, subtilisin, elastase |
| Factor Xa inhibitor       | Inhibits the coagulation factor.  |
| Carboxypeptidase- A       | Increases blood flow at the bite site.  |
| Histamine-like substances | It is a vasodilator and increases blood flow at the bite site.                                  |
| Acetylcholine             | It is a vasodilator.  |

It is used to treat musculoskeletal, cardiovascular, pulmonary, reproductive, and nervous system ailments, as well as earache, tinnitus, and eye diseases (Ünal and Erol, 2022). However, if they are not used correctly, they might cause bleeding, infection, anemia, and allergic responses (Bayır et al., 2021).

If there is an immune system weakness during leech application, preventive antibiotic treatment should be initiated (Gödekmerdan et al., 2011). Leeches can draw up to ten times their own weight in blood. It can also be seen in deaths caused by severe blood loss and prolonged bleeding. Furthermore, the patient must be careful in terms of anemia, allergy, and anaphylaxis. The leech should not be forcibly removed from its original location. Otherwise, difficulties may arise if it is not adequately eliminated using vinegar or a saline solution (Kavaklı and Tanrıverdi, 2009).

The most common complications are bleeding from long-term treatment, severe allergic reactions, tissue changes from repetitive leech therapy, and infections (Ayhan and Mollahaliloğlu, 2018).

## **F) Prolotherapy**

Prolotherapy is a treatment for chronic musculoskeletal illnesses (Örsçelik and Solmaz, 2023). Muscle and ligament injections are included

(Solmaz, 2019). The injection of a natural solution into the soft tissue of an injured joint accelerates the body's healing process, allowing the body to strengthen and restore painful joints and muscles (İnceöz et al., 2019). In the applied area, substances such as phenol, glycerin, zinc sulfate, sodium, platelet-rich plasma, growth hormone, and dextrose were injected (İkizek and Cemil, 2022; Avşar et al., 2021). Dextrose influences several pathways, including direct or osmotic impacts and inflammatory growth. Although dextrose concentration is significant, it is not the determining factor in the mechanism of action. Dextrose is present in 0.1% of normal human cells. Injections of dextrose at concentrations less than 10% immediately increase cell and tissue growth. When dextrose injections exceed 10% concentration, an osmotic impact develops in the cells in that region due to the strong concentration (Solmaz, 2019). Thus, the injection uses the effect of micro-trauma caused by the needle to return the joint's condition to normal by creating new collagen tissue and strengthening the ligaments. Although the cellular mechanism of action of dextrose is unknown, clinical investigations have indicated good clinical benefits when compared to blind injection controls (Edlin and Wirawan, 2022). Natural tissue healing occurs in three stages: inflammation, proliferation, and remodeling (Solmaz, 2019). It is commonly used in various sections of the body, including the low back and back pain, as well as waist and neck hernia, migraine, scoliosis, osteoarthritis, sports injuries, knee, hip, and shoulder (İnceöz et al., 2019). Prolotherapy can also be used to treat chronic musculoskeletal pain. Inflammation, the body's healing mechanism, is started, and pain is reduced with an immediate effect on pain centers; with a medium or long effect, the ligament-muscle grows stronger, and the joint returns to normal (Çakmak, 2017).

### **G) Homeopathy**

Homeopathy is a type of treatment that uses no external power to assist the body heal itself and is used to balance the life force (Türel, 2019). It is a well-known traditional and complementary medicine approach. Dr. It was invented by Samuel Hahnemann and is still widely used in most nations today. This field's popularity is growing by the day. When a healthy person is given a high dose, another person is given a very tiny amount of a chemical that would produce the same sickness, and recovery is shown (Arslan and Şar, 2013).



When utilized correctly, homeopathy is a natural, side-effect-free healing therapy. Simultaneously, he wishes to enhance the source of the disease-causing factor by concentrating on the patient's personality qualities, habits, lifestyle, and other comparable characteristics. It uses the factors identified in the person while providing this. Unlike traditional medicine, it seeks to identify the underlying reasons of the issues in order to stimulate the patient's life force and treat them (Kızıl and Atam, 2016). The lack of scientific evidence is one of the most common misconceptions about homeopathy. Homeopathic research is less common than other traditional and alternative medicine approaches; however, this should not be taken lightly. Although the number of homeopathic research conducted in recent years has been less than that of conventional medicine studies, they have the same quality rate (Ağaoğlu, 2019). Homeopathy is also used in a variety of fields.

### **1. Agrohmeopathy**

The use of homeopathic remedies in agriculture is gaining popularity. It has begun to be utilized, particularly in ecological agriculture, because it is inexpensive, does not disrupt the ecological balance, and has no negative side effects when applied to plants. According to research, homeopathy boosts the nutritional value of plants and contributes to the plant's qualitative traits and output. Furthermore, homeopathic medications have been found to improve plant tolerance to biological and non-biological stress (Lorenzo et al., 2021). The quality of homeopathic research was compared to the quality of conventional medical research in one study. When 110 homeopathic trials were compared against 110 conventional experiments under the same settings, it was discovered that 19% of homeopathic experiments and 8% of conventional medicine tests were of good quality. Nevertheless, their high quality in homeopathic experiments needs to increase (Ağaoğlu, 2019).

### **6. HOLISTIC AND FUNCTIONAL NUTRITION DIET APPROACHES**

It offers a comprehensive medical evaluation that includes holistic and functional nutrition, birth and health history, gastrointestinal health, illness history, exposure to environmental toxins, nutritional status assessment, microbiome analysis, and food intolerance and allergy testing. The holistic and

functional nutritional therapy approach contains significant goals for preventing morbidity and mortality, such as cancer and cardiovascular disease prevention, obesity and weight management, osteoporosis prevention, and aiding medical therapies. The dietician, who will be a practitioner of holistic and functional nutrition, should be trained and proficient in the utilization of functional foods as well as other integrative therapy modalities.

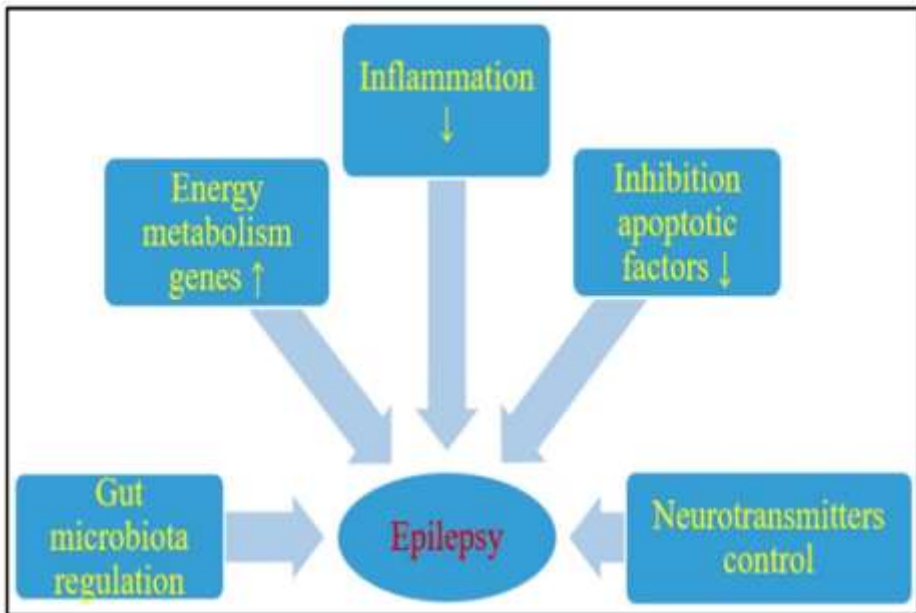
## **6.1. DIETS**

### **1) Ketogenic diet (KD)**

It is a form of nutrition that is high in fat, low in carbohydrates, and high in protein and energy, and was initially utilized in the treatment of pediatric epilepsy by Russell Wilder in 1921 (Wilder, 1921; Masood et al., 2020). In the 1970s, ketogenic diets were employed to control weight, and the Atkins diet was frequently cited (Paoli et al., 2013). The ketogenic diet increases leptin, ghrelin, and cortisol hormones while decreasing triglycerides, insulin, and inflammation (Thio, 2012). Ketogenic diet rates range from 2/1/1 to 6/1/1, with fat/protein/CHO being the most common (El-Mallakh and Paskiti, 2001). The traditional ketogenic diet calculates the content by dividing the total grams of fat and protein by the total grams of carbohydrates. The most favored way is to combine 3 or 4 g of fat with 1 g of protein-carbohydrate. This demonstrates that 90% of the energy consumed is derived from fats, whereas 10% is derived from carbohydrates and protein (Ünalp, 2017).

The ketogenic diet simulates hunger, raises blood ketones, and reduces blood glucose levels. As a result, it accelerates fatty acid oxidation and increases acetyl-CoA synthesis (Woolf and Scheck, 2015). Ketone bodies are more than just a source of energy; they also lower glucose consumption in the brain via modulating neurotransmitter activity (Certel and Ertugay, 1996). KD appears to improve ATP generation via ketone bodies or PUFAs while decreasing free oxygen radical production, both of which retain mitochondrial integrity and have neuroprotective benefits (Kossoff et al., 2009). The Modified Atkins Diet (MAD), Low Glycemic Index Therapy (LGITT), and Medium Chain Fatty Acid (MCT) Diet are effective treatments for children with epilepsy (Gümüş and Yardımçı, 2018). The ketogenic diet has recently surfaced as a potential metabolic treatment in cancer, with the goal of lowering insulin

secretion and converting fatty acids to ketone bodies, allowing the body to burn fat for fuel (Wang et al., 2020). For many years, the ketogenic diet has been utilized to treat epilepsy and neurological illnesses. While the effects of the Western and Mediterranean diets on the microbiota have been studied extensively, studies involving the ketogenic diet-microbiota relationship have frequently been conducted on epilepsy and neurodegenerative patients to whom the ketogenic diet is applied for therapeutic purposes (Swidsinski et al., 2017; Xie et al., 2017; Nagpal et al., 2019). Several hypotheses about ketone bodies have been proposed as essential mediators in the anticonvulsant action of the ketogenic diet. Several studies have focused on the role of neurotransmitters, brain energy metabolism, oxidative stress, and ion channels as potential processes, which are briefly described below (Calderón et al., 2017; Barzegar et al., 2019; Ułamek-Kozioł et al., 2019) (Figure 26).



**Figure 26.** Likely effect of a ketogenic diet on seizure activity. ↑- increase, ↓- decrease

The ketogenic diet has two types of negative effects: short-term and long-term. Symptoms such as discomfort and dizziness, exhaustion, sleeplessness, nausea, vomiting, lethargy, constipation, acidosis, and hypoglycemia are the most prevalent and short-term side effects. Long-term complications include

high triglyceride levels, dyslipidemia, severe hepatosteatosis, hypoproteinemia, vitamin and mineral shortages, redox imbalance, nephrolithiasis, and cardiomyopathy (Gupta et al., 2017; Masood and Uppaluri, 2018).

Patients should be monitored for acidosis, blood sugar, and ketone levels when starting the ketogenic diet. In the event of acidosis, 2-3 mEq/kg sodium bicarbonate can be administered. Every 6-8 hours, blood sugar should be tested. If your blood sugar goes below 50 mg/dl, drink 15-30 mL of fruit juice and retest in 30-60 minutes. If hypoglycemia continues, the ketogenic rate or calories can be increased (Roehl and Sewak, 2017). A randomized controlled trial was conducted between patients who began fasting on KD and those who began KD slowly, and it was discovered that hypoglycemia, acidosis, and weight loss were less common in patients who did not fast, and there was no difference in vomiting (Bergqvist et al., 2005).

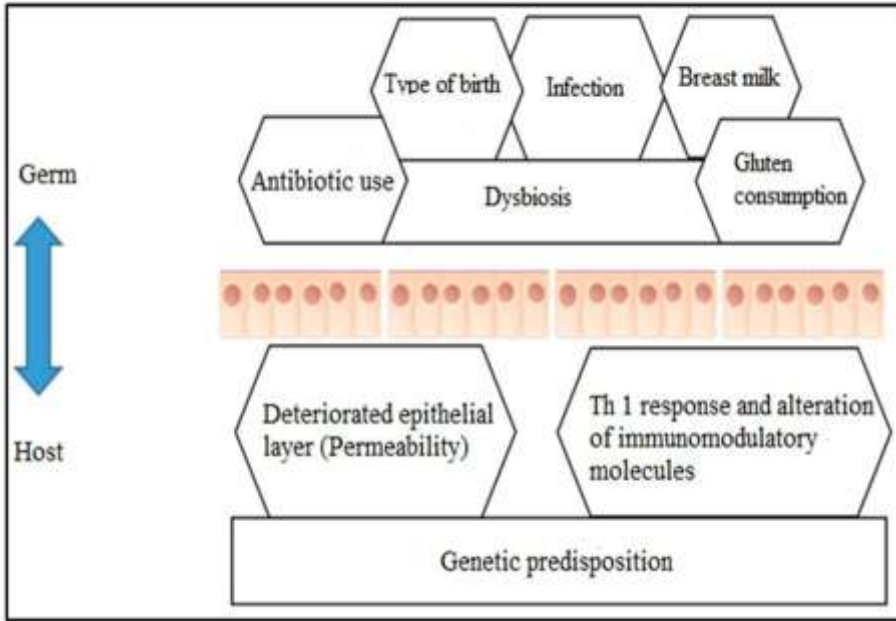
## **2. Gluten-free diet**

Gluten eating has been linked to a variety of diseases up to the present day. Celiac disease is the most common and well known of these illnesses. Gluten consumption, however, is now linked to a variety of health concerns, including several neurological illnesses, obesity, and autism, in addition to celiac disease (Biesiekierski et al., 2013). The disease's prevalence varies according to geographical region. Its prevalence is rising in places where wheat and its derivatives are widely consumed. It is more prevalent in Turkey and other parts of Western Europe, North America, Australia, and South West Asia (Dalgıç et al., 2011).

Gluten is a wheat protein. Wheat proteins are classified as albumin, globulin, gliadin, and glutenin. When gliadin and glutenin are combined with water, they make gluten. Glutenin gives elasticity and stickiness in dough, whereas gliadin offers extensibility, viscosity, and fluidity (Hayt, 2018). Celiac disease is an autoimmune, systemic disease that develops in genetically predisposed individuals because of permanent sensitivity to gluten in the diet and advances with intestinal and extra-intestinal abnormalities (Guandalini and Setty, 2008). Oats boost the nutritional content of celiac patients' meals by increasing fiber, B group vitamins, magnesium, and iron intake. However, patients using oats must still be closely monitored (Rubio-Tapia et al., 2013). Rice, corn, legumes, meat, fish, eggs, potatoes, soybeans, fruits, and vegetables

are gluten-free and can be included in patients' diets. Because gluten is utilized as a binder in ready-made products due to its viscoelastic property, it is important to check the label (Theethira and Dennis, 2015; Özkaya and Özkaya, 2018).

Environmental variables, genetics, and immunological response all have a role in the disease's etiology. Figure 27 depicts well-known elements that contribute to the start of the disease (Cheng, 2016).

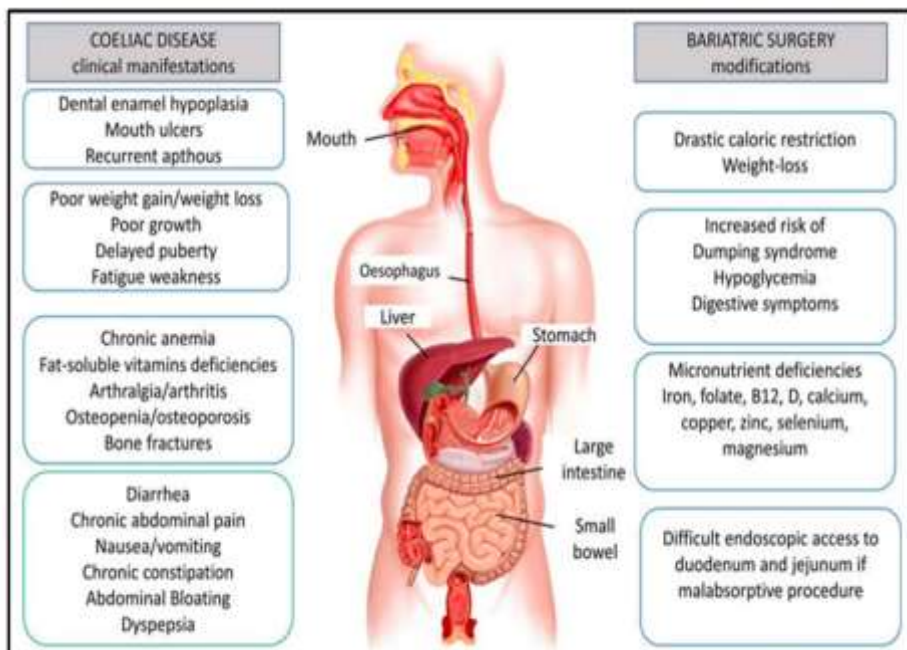


Şekil 27. Factors involved in the onset of celiac disease

Celiac disease deteriorates the villi structures that contribute to digesting in the intestines, reducing nutrient absorption and causing damage in the small intestine (Yağdı and Konuşkan, 2021). Celiac disease type II. It was identified as an illness linked to wheat eating during WWII (Ulusoy and Rakıcioğlu, 2019). These people must follow a gluten-free diet for the rest of their lives, and it is critical that they do so in order to improve their health and quality of life (Oxentenko and Rubio-Tapia, 2019). A gluten-free diet has been the most significant aspect of celiac disease treatment since the significance of gluten in the disease's development was discovered (Losowsky, 2008). Abdominal pain, bloating, gas, diarrhea, or constipation are the most prevalent clinical signs of

the condition. Aside from them, there are indicators of weariness, leg discomfort, headache, rash, and depression. Although the gluten-free diet is effective in these patients, it is unclear how long it will be followed (Catassi et al., 2015). According to a study that interpreted the body structure and nutrient consumption of adult individuals who follow a gluten-free diet program, the diets of individuals who follow a gluten-free diet program are not considered adequate and balanced, and that the energy taken from the fat group is higher and the energy taken from the carbohydrate group is lower (Kupper, 2005). It has been determined that there are fewer species in the intestinal microbiota of celiac patients compared to healthy individuals (Gobbetti et al., 2018).

Abdominal discomfort, diarrhea, and pain are the most prevalent clinical signs. Many patients, however, do not have gastrointestinal manifestations and instead exhibit other signs and symptoms such as low stature, infertility, neurological abnormalities, or dermatitis herpetiformis (Patel and Robert, 2022). Due to its numerous varied clinical signs and multi-organ presentations, celiac disease is vastly underdiagnosed. Figure 28 depicts clinical signs of celiac disease (gastrointestinal in green) and the potential influence of bariatric surgery (Lojou et al., 2020).



**Figure 28.** Clinical manifestations of celiac disease

A study comparing gluten-free and gluten-free items found that each gluten-free product is more expensive than its wheat-containing counterparts. It has been claimed that the cost rate of gluten-free items is close to 240%, with gluten-containing and gluten-free pasta variations having the greatest price differential (Lee et al., 2007).

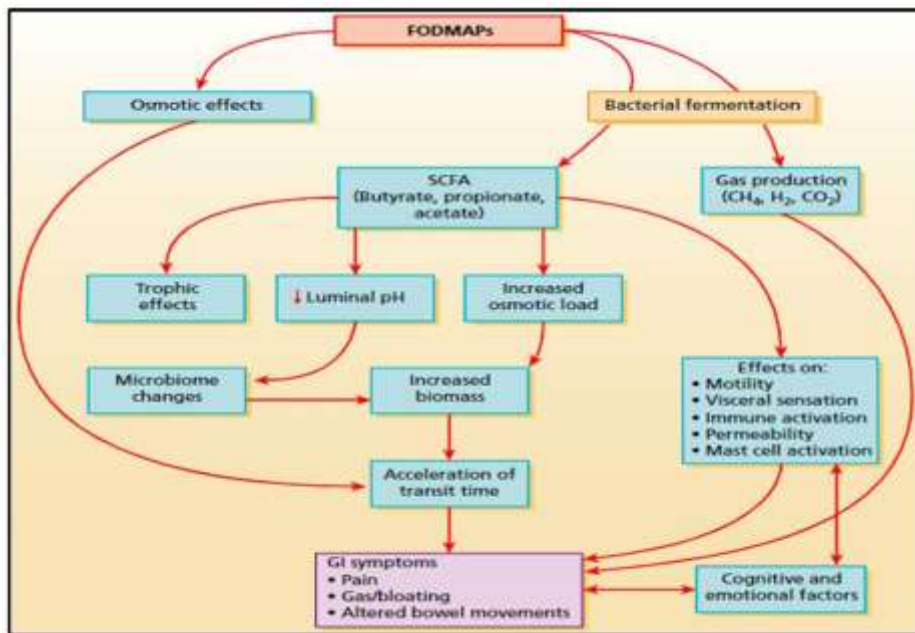
Because the techniques used to eliminate gluten from meals, modify the micro and macronutrient components of the food, the quality of the food changes as well. Gluten-free foods are lower in folate, iron, fiber, and B vitamins. Furthermore, gluten-containing foods have a higher glycemic index and include more carbohydrates and lipids than non-gluten-containing foods (Penagini et al., 2013). To get the recommended amount of fiber, choose fiber-rich grains and legumes (7-10g/100g) such as amaranth, buckwheat, and quinoa over gluten-free grains like rice and potatoes, which are commonly consumed in gluten-free nutrition programs. A minimum of 4-5 servings of fruit and vegetables should be consumed each day to achieve the micronutrient requirements required to prevent nutrient deficits (Theethira et al., 2014).

Celiac disease is presently diagnosed using the modified Marsh classification and scoring as recommended by the World Gastroenterology Organization Global Guidelines (2016) (Anonymous, 2023a). Positive serological antibodies and inspection of characteristic histopathological findings are used to make the diagnosis (Farrell and Kelly, 2001). A small intestinal biopsy is only advised if there is a significant clinical suspicion based on positive or negative serologic tests. Endoscopy reveals a reduction in the number of circular folds in the duodenum as well as a reduction in the appearance of mosaic and nodular velvet in the mucosa (Singh et al., 2018; Husby et al., 2012).

### **3. FODMAP diet**

Gut-brain interaction disorders are gastrointestinal (GI) disorders characterized by any combination of motility dysfunction, visceral hypersensitivity, altered mucosal and immune function, altered gut microbiota, and altered central nervous system functioning (Drossman and Tack, 2022). Irritable bowel syndrome (IBS) is a common functional gastrointestinal illness that affects 10% to 20% of people in affluent nations (Ebling et al., 2011). The

burden of symptoms such as stomach pain, soft and watery stools, cramps, and bloating, particularly in Diarrhea-dominated (IBS-D), can greatly affect patients physically, emotionally, and socially, and is associated with considerable impairments in job productivity (Buono et al., 2017). Gut-brain interaction disorders are gastrointestinal (GI) illnesses that include motility failure, visceral hypersensitivity, altered mucosal and immunological function, altered gut microbiota, and altered central nervous system functioning (Drossman and Tack, 2022). Irritable bowel syndrome (IBS) is a prevalent functional gastrointestinal disorder that affects 10% to 20% of the population in developed countries (Ebling et al., 2011). The burden of symptoms such as stomach pain, soft and watery stools, cramps, and bloating, particularly in Diarrhea-dominated (IBS-D), can have a significant physical, emotional, and social impact on patients, as well as significant impairments in job productivity.



**Figure 29.** Suggested mechanisms by which FODMAPs cause GI symptoms

In the pathophysiology of Crohn's disease, the Monash group coined the term Fermentable Oligosaccharides, Disaccharides, Monosaccharides, and Polyols (FODMAP) in 2004. The classification of FODMAPs and intense food composition study in 2005 resulted in the development of the low-FODMAP



diet, which is currently widely used as a treatment strategy for IBS (Gibson, 2017). Although there is no definitive diagnostic procedure for FODMAP-related intolerance reactions against specific foods, the amount of absorption of the test carbohydrate is determined by completing the respiratory hydrogen or methane test (Barrett, 2013). Two recent systematic evaluations of randomized trials reveal considerable evidence for the short-term advantages of a low-FODMAP diet on IBS GI symptoms and quality of life (El-Salhy, 2016). Consumption of fermentable oligo-, di-, monosaccharides and polyols (FODMAPs) and insoluble fiber causes IBS symptoms. When FODMAPs and insoluble fiber reach the distal small intestine and colon, they raise the osmotic pressure in the large intestine lumen and promote gas production, acting as a substrate for bacterial fermentation. Abdominal distention and pain/discomfort are caused by increased gas (El-Salhy, 2015).

The diet model that restricts fermented oligosaccharides, disaccharides, monosaccharides, and polyols (FODMAP) is recognized to be successful in managing inflammatory bowel syndrome (IBS) symptoms (Halmos et al., 2015; Böhn et al., 2015). Foods containing FODMAPs may cause gastrointestinal discomfort in people who are sensitive to them. Co-administration of the FODMAP Diet with the GFD is expected to successfully relieve gastrointestinal symptoms and psychosocial difficulties in celiac disease patients with high intestinal permeability (Roncoroni et al., 2018). A three-stage diet that includes low-FODMAP foods can help lessen intolerance symptoms. The diet includes a short-term (2-8 weeks) reduction in FODMAP-containing food consumption, followed by a reintroduction phase with only one type of FODMAP-containing food (e.g., bread or honey) to assess tolerance, and only identified foods are avoided and the diet is reduced during reintroduction. Incorporates more customized long-term treatment (Barrett, 2017; Whelan et al., 2018; Tuck et al., 2019). Table 16 contains a list of foods with high and low FODMAP levels (Bellini et al., 2020; Muthukumar et al., 2020; Yılmaz and Tekinşen, 2022).

**Table 16.** Top foods with high and low FODMAPs

| Food                   | High   | Low  |
|------------------------|--|--|
| Fruit                  | Apricot, apple, blackberry, mango, peach, pear, plum, dates, watermelon        | Avocado, banana, blueberry, melon, cherry, grape, grapefruit, melon, lemon, kiwi, orange, tangerine, pineapple, pomegranate, strawberry, olive |
| Vegetable              | Artichokes, asparagus, garlic, cauliflower, onion, leeks, mushrooms, peas      | Beans, broccoli, pumpkin, cabbage, red pepper, carrot, celery, cucumber, eggplant, lettuce, potato, radish, arugula, spinach and zucchini      |
| Dairy and Products     | Cow's milk, goat's milk, sheep's milk, milk desserts, powdered milk, ice cream | ripened cheeses, parmesan, cheddar and feta cheese, butter, cream  |
| Legumes and Oily seeds | Chickpeas, kidney beans, soy beans, lentils, pistachios, peanuts               | Almonds, hazelnuts, flax seeds, pumpkin seeds, sesame, tahini  |
| Cereals                | Barley, rye and wheat tortillas, cereal, couscous, noodle                      | Corn, gluten-free bread, oats, rice, biscuit   |
| Others                 | Fruit juices, corn syrup, honey, sorbitol, polydextrose, inulin                | Sugar, ginger, olive oil, glucose, artificial except sugar alcohols sweeteners   |

#### 4. Paleolithic diet

It is a modern rendition of the Paleolithic or "Old Stone Age" cuisine. This time period focuses on the morphological and physiological changes that happened in humans as they adapted to climate change, learned to cook meat on fire, and used stone tools to obtain better access to varied food sources (Challa et al., 2022). Based on data from studies on the Paleolithic Age and modern hunter-gatherer tribes, it was established that the saturated fatty acids

consumed by humans in the past were lower than those in modern diets (Caballero, 2005). The Paleo diet is defined as a diet that seeks to emulate the food of humans living during the Paleolithic period. "Paleo diets" have acquired favor not just from a scientific standpoint, but also as a healthy lifestyle, based on the argument that contemporary environmental changes adapt to human physiology relatively fast (Steger et al., 2017). In general, the Paleolithic diet is predicated on the assumption that modern humans were genetically adapted to their Paleolithic predecessors' diet. As a result, the optimal diet is to ingest wild plants and animals, much as their ancestors did during the Paleolithic period (Patel and Suleriabc, 2017).

Cereals are estimated to have been introduced into the human diet around 10,000 years ago. As a result, it is stated that cereals should not be taken since the human gut or microbiota do not adjust correctly to these significant dietary changes (Costabile et al., 2008; Schnorr et al., 2014). The Paleolithic diet consists of meat, fish, eggs, nuts, seeds, fruits and vegetables, coconut oil, olive oil, avocado oil, lard, butter, and minimally processed sweeteners (raw honey, maple syrup, coconut sugar, stevia) (Chenard et al., 2019).

With the move to settled life in the Neolithic period and the introduction of agriculture, the Paleolithic Age diet evolved into what is now known as the classical Mediterranean style of cuisine (Uhri, 2015). Paleolithic nutrition is a type of diet that emphasizes fibrous meals high in vitamins and minerals (Klement et al., 2013).

The current outbreak of civilizational ailments is being blamed on a mismatch between our modern cuisine and our paleolithic DNA (Kuipers et al., 2012). Dairy products, cereals, refined sweets, refined vegetable oils, and alcohol are especially common in today's western diets (Cordain, 2006). As a result, the paleolithic diet (PD) (Figure 30) was predicted to contain 37% protein, 41% carbohydrate, and 22% fat (Singh and Singh, 2023). The paleolithic diet contains lean meat, nuts, olive oil, fresh vegetables, and fruits.



**Figure 30.** The paleolithic diet

Barone et al. (2019) reported that bacterial diversity rose with Paleo diet (diet with unprocessed items, grain, milk and products, salt, and refined sugar removed) in 15 Italian participants (3 women, 12 men).

### **5. Wahls™ and Swank diet**

Multiple sclerosis (MS) is a chronic immune-mediated neurodegenerative disease characterized by neuronal demyelination induced by an inflammatory response caused by T lymphocyte migration into the central nervous system (Thompson et al., 2018; Titcomb et al., 2020). Multiple therapies, including disease-modifying medications and stimulants, exercise, energy conservation, and stress management approaches, are most typically used to treat MS-related fatigue (Krupp, 2003; Wahls et al., 2018). The low-saturated fat diet created by Dr. Swank and the modified Paleolithic diet developed by Dr. Wahls are two dietary regimens with early data (Evans et al., 2019; Wahls et al., 2021). The Swank diet, a low-fat diet with saturated fats limited to less than 15 g/day and unsaturated fats limited to less than 40 g/day, is supplemented with vitamins, cod liver oil, and fish oil (Swank and Goodwin, 2003). Swank also recommended losing weight (Mowry et al., 2018). Furthermore, this diet recommends 45-250 g/day of fresh fruit, 20-250 g/day of

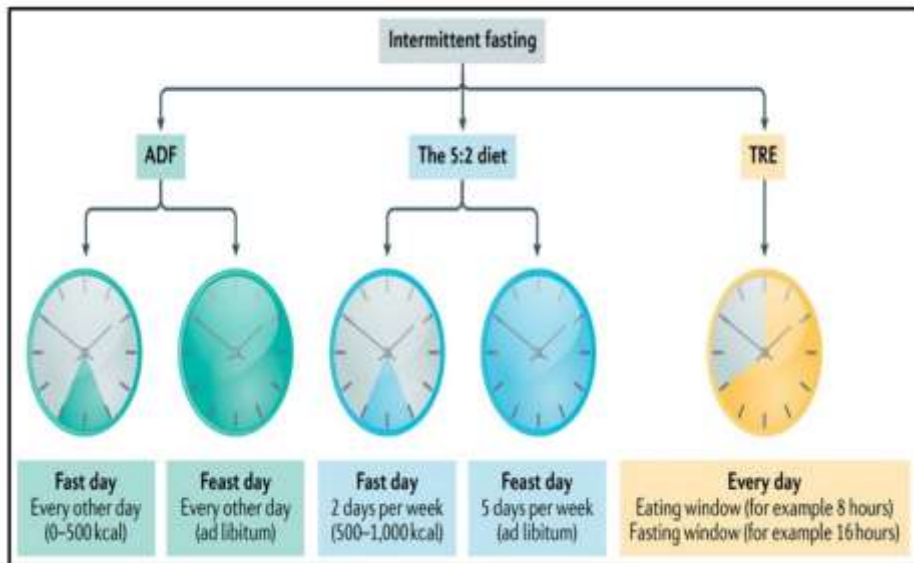
fresh vegetables, nonfat or low-fat milk and dairy products, whole grains, legumes, eggs (unlimited egg whites or 3 times/week whole eggs), and 3 cups/day of caffeinated beverages (Kamanlı and Bilici, 2021).

Dr. Wahls created the Modified Paleolithic (Paleo) Wahls™ diet. Terry Wahls created it based on the Paleo diet principles and a review of the scientific literature (Wahls et al., 2018). Wahls' diet is a multimodal regimen that includes dietary supplements, exercise, neuromuscular electrical stimulation, massage, and meditation (Karaağaç et al., 2021). A case on the Wahls Elimination diet showed significant regression from wheelchair reliance to slight gait disruption (Wahls et al., 2021). It has also been observed that persons who adhere to a strict Paleolithic diet are vulnerable to vitamin E, vitamin D and calcium deficits (Masullo et al., 2015). Wahls felt that a Paleolithic diet that avoided particular dietary antigens (gluten, casein, and lectins) while increasing micronutrient density might improve health and prevent disease progression (Wahls et al., 2021).

## **6. Intermittent fasting**

A diet paradigm arose as an alternative to the traditional energy restriction diets that gained popularity due to the influence of celebrities such as Hugh Jackman and Jimmy Kimmel. Although this diet paradigm has lately become popular, its roots date back thousands of years and are based on hunter-gatherer dietary practices (Obert et al., 2017).

The time to eat foods, rather than the variety of foods, is the most significant aspect in this diet. Meals are skipped on purpose in an intermittent fasting diet, and people are hungry for longer than the time allotted for eating (Tuzgöl, 2018). Alternate day fasting (ADF), the 5:2 diet, and time-restricted eating (TRE) have attracted the greatest scientific interest (Tinsley and La Bounty, 2015; Harvie and Howell, 2017; Patterson and Sears, 2017; de Cabo and Mattson, 2019; Varady et al., 2021, Figure 31). Food intake days, when food is consumed at the desired time and amount, and fasting days, when people use 25% of their energy needs, are examples of alternate hunger. A time-restricted diet is one in which food is consumed for eight hours or less per day. Religious fasting, on the other hand, includes not eating or drinking between the hours of dawn and sunset for thirty days (Longo and Mattson, 2014).



**Figure 31.** Intermittent fasting categories. Food consumption timing during alternate day

Fasting (ADF), the 5:2 diet, and time-restricted eating (TRE). The darkened areas of the clock symbol represent food intake periods. In the majority of trials, the indicated meal window for TRE is 8 hours. The recommended food intake window for ADF and the 5:2 diet is 17:00 h to 19:00 h. The fast day meal, on the other hand, can be had all at once or spaced out over the day, depending on personal preference.

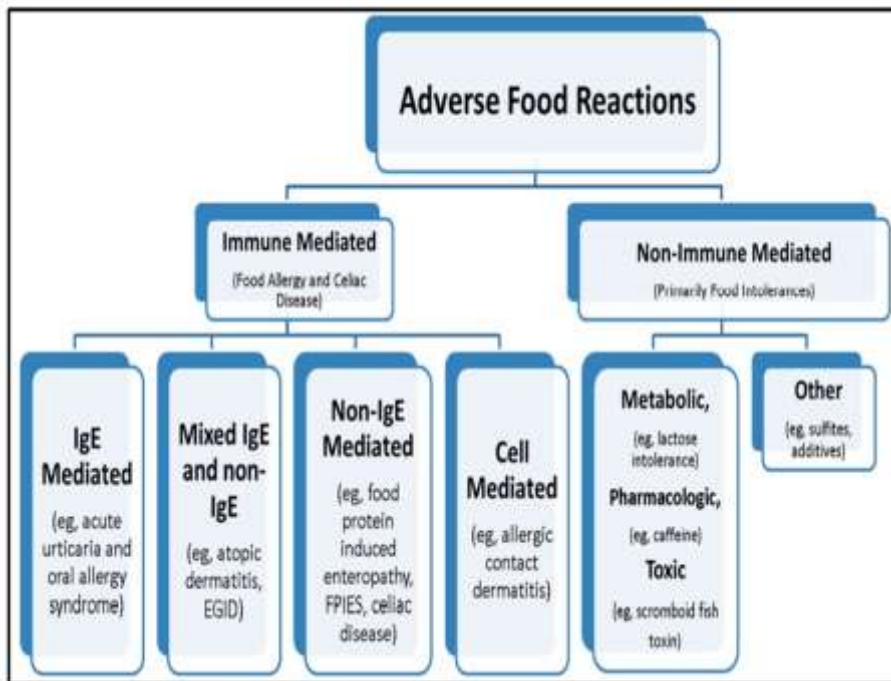
Obesity and various chronic diseases caused by being overweight are caused by a combination of high calorie intake and a sedentary lifestyle, which reduces persons' quality of life (Akpınar and Akbulut, 2019). Cells respond to intermittent fasting by increasing antioxidant defense system expression, DNA repair, mitochondrial anabolism, autophagy, and decreasing inflammation (Anton et al., 2018). Although daily energy restriction is used in many body weight loss programs, intermittent energy restriction is viewed as an alternative option (Johnstone, 2015). According to research, intermittent fasting diets, which are now used in the treatment of obesity, regulate weight regulation and biomarkers that affect metabolism (Longo and Mattson, 2014). The studies highlight three primary hunger strategies: calorie restriction, food restriction, and intermittent (periodic) fasting. Intermittent fasting has been shown to alleviate the symptoms of lifestyle-related disorders such as diabetes,

cardiovascular disease, cancer, and oxidative stress (Serdar, 2020). Although studies on intermittent fasting diets vary depending on the working type and diet model, all intermittent fasting diets cause metabolic differences such as maintaining normal blood glucose levels, emptying glycogen stores, mobility of fatty acids and formation of ketone bodies, decrease in circulating leptin and increase in adiponectin (Johnson et al., 2007; Harvie et al., 2011).

According to studies, the intermittent fasting diet paradigm improves physiological and cognitive processes and can help people live longer lives (Moro et al., 2016). Meals are skipped voluntarily within a program in this paradigm, and a diet is used by fasting for longer than the time allocated for eating and subsequent satiety (Patterson et al., 2015). Clinical research has shown that a regular intermittent fasting diet reduces body fat rate by managing plasma glucose level and lipid profile, hence increasing life expectancy. Because of these advantages, the intermittent fasting diet concept is gaining popularity (Tinsley and La Bounty, 2015).

## **7. Elimination diet**

Chafen et al. (2010) define food allergy as an aberrant immune system response to food. Food allergies are classified as IgE or non-IgE immune responses. Skin findings such as urticaria, eczema, angioedema, digestive system complaints such as vomiting and nausea, or respiratory system findings such as rhinitis and asthma attacks occur within 2 hours of food consumption in IgE-mediated food allergies; enterocolitis, proctocolitis, and enteropathy occur in non-IgE-mediated food allergies. Another type of mixed group includes eosinophilic esophagitis and atopic dermatitis (Boyce et al., 2011). The most common allergy foods in childhood are cow's milk, eggs, sesame, and peanuts; in adolescence, we can mention almonds, peanuts, and shellfish. For proper disease assessment, diagnostic techniques for food allergies must be utilized in conjunction with clinical symptoms (Figure 32; Sampson et al., 2014; Anvari et al., 2019).



**Figure 32.** Classification of adverse reactions to food

Children's growth and development during infancy may be hampered if they exhibit food-related allergy symptoms such as digestive system, rash, respiratory system abnormalities, and hypersensitivity. In the treatment of these youngsters, an elimination diet is used. Many vital nutrients are included in the elimination diet, especially in children with numerous food sensitivities. Elimination diet therapy is continued until the patient's problems resolve; malnutrition may occur if there is insufficient calorie, vitamin, and mineral intake due to the nutrients excluded (Venter et al., 2012). Some difficulties should be addressed with children during dietary elimination. These;

- a. Substituting the most suitable other food in place of the removed food,
- b. Not to adversely affect the growth and development of the child,
- c. Not to cause anemia, hypoproteinemia, vitamin and mineral deficiencies,
- d. Consistently eliminating foods that cause anaphylaxis (Arıcan Hacımustafaoğlu, 2002).



The food elimination diet is described as removing all foods suspected of causing an allergic reaction from the diet for at least 21 days. Its success depends on detecting the proper allergen or allergens and the patient's capacity to eliminate all forms of the suspected allergen from the diet (Agata et al., 1993). The Elimination Diet (ED) is a diagnostic and therapy approach. It is preferred as a method of preventing allergy illnesses or treating food intolerances (Arvola and Holmberg-Marttila, 1999). Multiple sclerosis, hashimoto, ulcerative colitis, and scleroderma are all commonly treated using an elimination diet. The elimination diet, according to the holistic and functional nutrition approach, can be a valuable technique in stabilizing the intestinal lining and strengthening the immune system in the permeable intestine when planned appropriately and properly (Serdar, 2020).

## **7. CONCLUSION and RECOMMENDATIONS**

In order to better their health, people seek treatment from contemporary medicine or other medical procedures. Many people are looking for alternatives to modern treatment since they are less expensive, more accessible, and have a higher level of interest. While being treated, they acquire herbal mixes, pills, and creams and use them in random doses without questioning, despite the fact that many of them do not even know their names. Herbal drugs, in particular, have numerous potential benefits as well as negative consequences when misused. This procedure should be carried out under the supervision of medical personnel. However, due to a lack of understanding in this field, health professionals do not endorse alternative therapy methods to modern medicine. As a result, treatment is carried out under the supervision of skilled trainers and health specialists. Even among those who have earned schooling, individuals in our country have a very low level of health-related information. As a result, considering public health education, it is believed that primary care providers working in these institutions will be more responsive by locating institutions to which citizens can turn when they meet any health-related difficulty. Many of the institutes that offer training in the name of functional medicine are not formally authorized without any constraints. As a result, information is attempted to be exchanged by persons who lack adequate infrastructure. As a result of these trainings, the likelihood of difficulties arising in treatment approaches used by people with insufficient understanding increases. As a

result, it should be noted that in order to receive alternative medicine trainings, it should be noted that the training information of the authorized person who will perform the application should be checked, and when it is desired to have an alternative medicine application, it should be noted that the training information of the authorized person who will perform the application should be checked. As a result, further research in this subject is needed to gather more information, enlighten the public, and use and promote positive treatments that do not require the use of additional pharmaceuticals.

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