



# Electroconvulsive Therapy in Child and Adolescent Psychiatry

## Çocuk ve Ergen Psikiyatrisinde Elektrokonvulsif Tedavi

© Duygu Özer<sup>1</sup>, © Gül Dikeç<sup>2</sup>

<sup>1</sup>University of Health Sciences, İstanbul, Turkey

<sup>2</sup>Fenerbahçe University, İstanbul

### ABSTRACT

Electroconvulsive therapy (ECT) is one of the effective treatment methods which was used in treatment of childhood and adolescent psychiatry. Although the effects and side effects of ECT intervention in child and adolescent psychiatry is similar adult psychiatry, mental health professionals might be reluctant to prefer ECT in children and adolescents due to limited knowledge and negative attitude to ECT. Because the articles on ECT among child and adolescent with severe mental disorders were limited studies of case reports, it could not reach any article which evaluated ECT holistically, it was thought to discuss ECT intervention, legal issue and nursing care in this issue and this review will contribute to the literature about ECT in children and adolescents.

**Keywords:** Child and adolescent psychiatry, electroconvulsive therapy, psychiatric nursing

### ÖZ

Çocukluk ve ergenlik döneminde görülen ciddi ruhsal bozuklukların tedavisinde kullanılan etkili yöntemlerden biri elektrokonvulsif tedavi (EKT)dir. Çocuk ve ergen psikiyatrisinde EKT uygulamasının etki ve yan etki açısından yetişkinlerden farklı sonuçlar elde edilmemesine rağmen; ruh sağlığı çalışanlarının, EKT ile ilgili sınırlı bilgi düzeyi ve EKT'e yönelik olumsuz tutumlarından dolayı çocuk ve ergenlerde EKT'yi tercih etmekten çekinebilmektedirler. Çocuk ve ergen psikiyatrisinde EKT uygulaması ile ilgili verilerin sıklıkla olgu sunumları ile sınırlı olması, çocuk ve ergenlerde EKT uygulamasının her yönü ile değerlendirildiği bir yazıya ulaşamaması nedeniyle, bu derleme ile çocuk ve ergenlerde EKT uygulaması, EKT'nin yasal boyutu ve hemşirelik bakımı konusunda güncel literatüre katkı sağlanacağı düşünülmektedir.

**Anahtar sözcükler:** Çocuk ve ergen psikiyatrisi, elektrokonvulsif tedavi, psikiyatri hemşireliği

## Introduction

Childhood and adolescence are the stages of preparation for adulthood and involve biological, spiritual, and social development and maturation (García-Carrión et al. 2019). Children and adolescents should adapt to many stressors to cope with the changes in the developmental period and mature. Facing mental problems during this period can lead up to mental disorders in adulthood. Many serious mental disorders, on the other hand, may arise in this period (Akçan et al. 2012, García-Carrión et al. 2019). The World Health Organization (WHO) (2020) reported that the rate of incidence of mental disorders in childhood and adolescence is 10-20% and that three out of four mental disorders occur in the early twenties.

Mental disorders arising in childhood and adolescence are the leading causes of disability in this period (Lu et al. 2018). Children and adolescents with mental disorders are stigmatized and

exposed to discrimination by society, their basic human rights are violated, and they have difficulties in accessing health and education services. If not treated effectively, mental disorders can prevent children and adolescents from developing, achieving educational attainment, and living a satisfying and productive life (Lu et al. 2018, WHO 2020).

Psychotropic drugs, psychotherapies, and electroconvulsive therapy (ECT) are used in the treatment of serious mental disorders seen in childhood and adolescence (Shoirah and Hamoda 2011, Sachs and Madaan 2012, Benson and Seiner 2019). ECT is one of the effective methods used in the treatment and based on generating epileptic seizures in the brain with controlled electrical stimulation, which is applied with electrodes placed at specific points on patient's head (Shoirah and Hamoda 2011, Benson and Seiner 2019). The concept of ECT use in children and adolescents connects psychiatric, neurological, and ethical aspects (Sachs and Madaan 2012). It was reported

**Address for Correspondence:** Duygu Özer, University of Health Sciences, Sultan II. Abdulhamid Han Training and Research Hospital, İstanbul, Turkey

**E-mail:** ozerduygu39@gmail.com **Received:** 24.02.2021 **Accepted:** 10.06.2021

**ORCID ID:** 0000-0001-5800-5099

that mental health professionals have limited knowledge on the application of ECT in child and adolescent psychiatry (Bilginer and Karadeniz 2019) and doubt to prefer ECT in children and adolescents in clinical circumstances with ECT indication (Lima et al. 2013, De Meulenaere et al. 2018, Bilginer and Karadeniz 2019). In the literature, there are no different results obtained from adults in terms of effects and side effects (De Meulenaere et al. 2018, Benson and Seiner 2019, Bilginer and Karadeniz 2019), the ratio of ECT use in children and adolescents to that in adults was found to be 65:1 (De Meulenaere et al. 2018) and 0.8% of patients who underwent ECT in our country were reported to be children and adolescents (Bilginer and Karadeniz 2019).

The data on the application of ECT in child and adolescent psychiatry are limited to case reports (Wachtel et al. 2010, Önder et al. 2018, Wachtel et al. 2018, Başgül et al. 2020) and there is no article dealing with ECT in children and adolescents in all aspects. In this context, this review aimed to discuss the ECT application, history, legality, and nursing care in child and adolescent psychiatry and contribute to the literature on this subject.

## History of ECT in Child and Adolescent Psychiatry

ECT has been used as an effective method in the treatment of mental disorders since 1938 (Shoirah and Hamoda 2011). In child and adolescent psychiatry, cases who underwent ECT were first reported in France in the early 1940s by Dr. Reported by Bour Heuyer (Sachs and Madaan 2012). ECT application in a large population was first performed in 1947 by Dr. Lauretta Bender and significant improvements were noted in children and adolescents diagnosed with schizophrenia (Sachs and Madaan 2012, Shorter 2014). The use of psychotropic drugs in children and adolescents started in the 1950s; therefore, the frequency of ECT use decreased from the 1960s to the 1980s (Benson and Seiner 2019). However, in the 1980s, it has been thought that the effects of psychotropic drugs in some cases were limited and the use of ECT has begun to increase again. After the 1990s, the number of studies reporting the effectiveness of ECT in child and adolescent psychiatry has increased (Walter et al. 2010, Shorter 2014). The American Association of Child and Adolescent Psychiatry (AACAP) published 'Practice Parameter for Use of Electroconvulsive Therapy with Adolescents' in 2004 to guide child and adolescent mental health professionals (AACAP 2004). It is known that Child and Adolescent Psychiatry clinics were established in our country after 1955 (Bilginer and Karadeniz 2019); however, no history of ECT application in children and adolescents in these clinics is available.

## ECT Application and Mechanism of Action

In ECT application, an electric current of 80-170 volts is given for 0.1-0.5 seconds in adults, and the dose of electric current in child and adolescent psychiatry is adjusted using the age method (dose of electric current =  $0.5 \times$  patient's age). After the dose of the initial electric current is calculated, epileptic seizures are expected to occur. However, if the seizure does not

occur, it is recommended to increase the electric dose by 40%-60% and evaluate the seizure duration (AACAP 2004). There is no standard scheme of treatment determined in ECT application; thus, the number and duration of sessions vary depending on the diagnosis and characteristics of the patient and the response to the treatment. It is reported in the literature that ECT can be performed in 7-12 sessions every other day (Lima et al. 2013). ECT is divided into two as the unilateral application (unilateral) or bilateral application (bilateral) according to the location of electrodes on patient's head. In unilateral application, memory disorders are less common; on the other hand, the symptoms of the disorder improve rapidly in bilateral application (Lima et al. 2013).

There are two different application methods for ECT. In the traditional method, a simple application is performed; an electrical stimulus is given and the seizure is monitored. This application method is no longer preferred today due to the high incidence of side effects such as fractures and dislocations. The other application method is the modified method (application with anesthesia and muscle relaxants). In this application, the patient is first put to sleep with a short-term anesthetic drug and then a muscle relaxant is administered. The seizure occurs by giving electric current. Today, applications are often performed using modified methods to reduce the side effects of ECT (Dönmez and Yılmaz 2011, Lima et al. 2013).

The curative effect of ECT on mental disorders has been recognized for years; however, studies to explain its mechanism of action are still ongoing. Although the mechanism of action of ECT cannot be fully explained, the effect generated with ECT is attributed to the increase in the efficiency of neurotransmitters in the brain (Hızlı et al. 2014). The balance of neurotransmitters in the brain is disturbed in mental disorders whereas the electrical stimulation in ECT ensures that the balance between these chemicals (Benson and Seiner 2019). There are many opinions that ECT increases the susceptibility of the receptors in the brain, accelerates the serotonin and dopamine cycles, provides synchronization between the left and right hemispheres, and rearranges the circadian rhythm (Benson and Seiner 2019, Bilginer and Karadeniz 2019). Unfortunately, no opinion on the mechanism of action of ECT in children and adolescents is available and it is reported that it has similar effects in adults (Bilginer and Karadeniz 2019).

## Indications and Effects of ECT

In child and adolescent psychiatry, it was reported that ECT is an effective alternative (Shoirah and Hamoda 2011, Puffer et al. 2016), that patients recover rapidly after ECT application, that it is effective in mood regulation and symptom control, that the duration of hospital stay is shortened, that remission period is prolonged, and that the quality of life of patients increases (Lima et al. 2013, Puffer et al. 2016). However, ECT is not recommended as the first-choice therapy for mental disorders in children and adolescents. It is stated in the guideline by the British National Institute of Clinical Excellence (NICE) (2009) that psychotropic

agents and psychotherapies should be co-used as the first-choice therapy for mental disorders in child and adolescent psychiatry and that ECT should be preferred in recalcitrant or life-threatening conditions. Likewise, according to the data of NICE (2019), the use of ECT is not recommended in children and adolescents aged under 11 and the effectiveness of ECT was reported to be limited in cases aged under 11 who underwent ECT. There is information in the literature that ECT was applied to the 7-year-old cases; however, it was emphasized that side effects were more frequently encountered and that the duration of remission was shorter in these children (AACAP 2004, Walter et al. 2010). Therefore, ECT is recommended for children and adolescents aged 11 and over (Shoirah and Hamoda 2011).

The criteria for ECT application in adolescents were clarified in the guideline published by the American Association of Child and Adolescent Psychiatry in 2004. These criteria are (1) the presence of a mental disorder with an ECT indication, (2) the presence of permanent disability or life-threatening symptoms, and (3) not responding to two different psychotropic drug therapies in adolescents (AACAP 2004). In the literature, ECT application in child and adolescent psychiatry is mainly recommended for major depression, bipolar disorder, schizophrenia, and catatonia (NICE 2009, Zhang et al. 2016). It was also seen that positive outcomes were achieved in cases with neuroleptic malignant syndrome, intellectual disability, autism spectrum disorder, eating disorder with severe mood disorders, and treatment-resistant Tourette syndrome (Wachtel et al. 2011, Dhossche et al. 2019, Karayağmurlu et al. 2020). In the study conducted by Zhang et al. (2016), ECT was applied for children and adolescents with mental disorders including bipolar disorder by 57.8%, schizophrenia and other psychotic disorders by 46.5%, major depressive disorder by 41.8%, and other mental disorders by 23.9%. In a study conducted in our country, it was found that ECT was applied in child and adolescent psychiatry to patients diagnosed with bipolar disorder (53.2%), major depressive disorder (25.8%), schizophrenia (12.9%), and schizoaffective disorder (8.1%) (Karayağmurlu et al. 2020).

ECT is reported to be the gold standard for treatment-resistant major depressive disorder (AACAP 2004, NICE 2009, Zong et al. 2020). In major depression, ECT is preferred in the presence of life-threatening symptoms such as agitation, aggression, or suicidal behavior (Benson and Seiner 2019). It was also reported that ECT is effective in children and adolescents with persistent and severe recalcitrant symptoms (Parker and Hunt 2019). For instance, ECT is recommended in cases with psychotic treatment-resistant depression or in cases where physical health is impaired due to insufficient oral intake (AACAP 2004, Zong et al. 2020). In a case report (Önder et al. 2018), it was stated that reduced the severity of depression, aggressive behavior, and suicidal ideation in an adolescent diagnosed with major depression who did not respond to pharmacological treatment. In a study, it was found that the severity of depression decreased by 63% after ECT in children and adolescents diagnosed with major depression (Wachtel et al. 2011).

ECT is frequently used in the treatment of bipolar disorder and schizophrenia as well as depressive disorders and was reported to be effective in reducing psychotic symptoms, regulating mood, and getting risky behaviors such as agitation and suicidal behavior under control (Benson and Seiner 2019). In the study of Wang et al. (2018), it was found that the ratio of application of ECT in the treatment of 835 children and adolescents with schizophrenia was 49.2%, that the duration of remission was longer in children and adolescents who underwent ECT compared to the control group, and that aggression and suicidal behavior decreased while hospitalizations. In the case report published by Başgöl et al. (2020), the effect of ECT administered to an adolescent diagnosed with bipolar disorder on the symptoms of comorbid substance use disorder and body dysphoric disorder was evaluated. As a result of ECT applied to the adolescent with treatment non-compliance and treatment resistance, the symptoms of body dysphoric disorder were completely recovered and the symptoms of mania and, accordingly, substance use decreased. In their case report, Wachtel et al. (2018) stated that a significant decrease was seen in self-harm behaviors of an 11-year-old boy with comorbidity, bipolar disorder and autism spectrum disorder (ASD), after ECT. In another case report, ECT was applied to 3 patients with ASD accompanied by severe catatonia and it was reported that the catatonic symptoms of the individuals were completely eliminated after ECT application (Wachtel et al. 2010). It was reported in the literature that ECT application is very effective in children and adolescent catatonia cases as in adults and should be included in the treatment plan (Wang et al. 2018).

In studies investigating the long-term effects of ECT in child and adolescent psychiatry, it was reported that the symptoms of the disease decrease or are completely eliminated and that individuals need fewer psychotropic agents (Bloch et al. 2018, Mitchell et al. 2018). Mitchell et al. (2018) applied ECT to 25 adolescents with major depressive disorder and intense suicidal ideas and reported that major depressive symptoms were completely eliminated after ECT (after 44 months on average), 78% of the adolescents had no suicidal ideas, that school performance of 63% increased, and that the rate of using psychotropic agents decreased in 58% compared to the pre-application period. In a study, the opinions of 79 adolescents who underwent ECT in China and 79 parents about the effects of ECT were taken (Zong et al. 2020). It was reported that the symptoms of adolescents decreased (81%) after ECT, that ECT was more beneficial (54.4%) and had a faster effect (48.1%) than the psychotropic agents they used before, that ECT was a safe application (55.7%), and that they could undergo ECT again if their disease recurred (51.9%). Parents of the adolescents stated that the symptoms of their children decreased (70.9%) after ECT, that ECT was more beneficial (45.6%) and had a faster effect (48.1%) compared to the psychotropic agents, that ECT was a safe application (43%), and that they could allow ECT for their children again if the disease recurred (53.2%). With the increase in the number of studies proving the long-term effects of ECT, it is predicted that the prejudices against ECT among child and adolescent mental health professionals will decrease and that the use of ECT in the treatment of serious mental disorders will become even more common (Lima et al. 2013, Mitchell et al. 2018).

## Contraindications of ECT

In the literature, contraindications of ECT in adult patients are reported (Benson and Seiner 2019) whereas no contraindications of ECT are reported in children and adolescents due to the lack of studies in child and adolescent psychiatry. ECT contraindications in adults are also considered contraindications in children and adolescents (AACAP 2004, Lima et al. 2013). Conditions such as recent myocardial infarction, aortic aneurysm, pulmonary edema, hypertension, severe brain infections, conditions that increase intracranial pressure, brain tumors, recent cerebral defect, retinal detachment, and glaucoma are also considered as contraindications in child and adolescent psychiatry (AACAP 2004, Walter et al. 2010, Lima et al. 2013, Benson and Seiner 2019). Due to such conditions, it is necessary to request relevant medical consultations prior to ECT in child and adolescent psychiatry, evaluate the child and adolescent, and conduct a more detailed medical screening of the patient in the presence of possible contraindications (AACAP 2004, Benson and Seiner 2019).

## Side Effects of ECT

ECT is considered a safe treatment method for child and adolescent psychiatry as well as for adult psychiatry (Wang et al. 2018) and it is stated that ECT rarely causes mortality and serious morbidity (Loiseau et al. 2017, Wang et al. 2018). Zhang et al. (2012) compared the side-effect rates of ECT and pharmacological treatment in adolescents and found that both intervention groups had non-serious side effects by approximately 5% and that there was no significant difference between the groups in terms of side-effect rates. It was stated that headache and dizziness were the side effects seen in the ECT group.

In the literature, the common side effects associated with ECT are reported to be headache, nausea, vomiting, muscle pain, confusion, and agitation (Loiseau et al. 2017, Wang et al. 2018, Stein et al. 2020). These conditions usually occur due to anesthesia and disappear in a short time (Stein et al. 2020). The serious side effects of ECT are prolonged seizures, amnesic disorder, and risks associated with general anesthesia (Zhang et al. 2012, Lima et al. 2013, Stein et al. 2020). Prolonged seizure (a duration of seizure of 180 seconds or over) is rarely seen (AACAP 2004); however, it is among the serious side effects (Loiseau et al. 2017). Prolonged seizures, a clinically important outcome, are associated with more postictal confusion and amnesia in patients and increases cerebral complications due to hypoxia (Grover et al. 2017). Immediate medical intervention should be considered if it is difficult to terminate the prolonged seizure or if the patient experiences spontaneous seizures. In such cases, ECT should be pursued only after the treatment risks and benefits are evaluated (Grover et al. 2017, Stein et al. 2020). Puffer et al. (2016) applied ECT to 51 adolescents and found that prolonged seizures were seen in 63% of patients after ECT and that the duration of prolonged seizures decreased as the age of patients increased. In another study (Grover et al. 2013), ECT was applied

to 39 adolescents and it was reported that side effects such as prolonged seizures, headache, nausea, and vomiting were seen in approximately 50% of the patients.

In amnesic disorders, which are among the serious side effects of ECT, impairment in short-term memory (hospitalization, etc.) before ECT is common (Stein et al. 2020). This condition is often recovered within 24 hours following ECT; however, it was reported to continue up to 2-6 months in some cases (Grover et al. 2013, Grover et al. 2017). In the systematic review of Stein et al. (2020), side effects that were seen in children and adolescents after ECT were headache, nausea, confusion, and short-term amnesia, as well as rare cases such as benign dysrhythmia and prolonged seizures; death was reported in 2 of 592 adolescents. The cause of death was reported as epileptic seizures that did not respond to the treatment. In their retrospective study, Dennis et al. (2017) examined death cases after ECT and reported that no death occurred in 5000 cases aged under 16 years. In the literature, it was stated that the mortality rate due to ECT application in child and adolescent psychiatric patients is very low and that death often occurs due to secondary complications (cardiac and neurological complications, aspiration pneumonia, etc.) that develop after the application (Watts et al. 2011, Dennis et al. 2017).

## Legal Aspects of ECT Application in Child and Adolescent Psychiatry

ECT application in child and adolescent psychiatry implies its legal aspect of the application, as it contains many elements. The foreseen ECT applications have not yet been attributed to certain legal rules (Lima et al. 2013) and the implementation guidelines of each country are different (Sachs and Madaan 2013). In European countries where the ECT use in children and adolescents is limited, the standards of ECT application are not different from adult patients (Shoirah and Hamoda 2011). The Mental Health Law of the People's Republic of China, one of the countries where the use of ECT is most common, was revised in 2013 and involves ECT in child and adolescent psychiatry (Zhang et al. 2016); in the Mental Healthcare Act of India, which was revised in 2010, it was reported that ECT is prohibited for children and adolescents (Balhara and Mathur 2012). In our country, there is no Mental Health Law; there is no standard related to ECT application in children and adolescents; the data on ECT applications in this population are limited (Bilginer and Karadeniz 2019). In the law draft prepared in our country, there is no section on the ECT application in child and adolescent psychiatry (Draft Mental Health Law 2018). In our country, the 'Directive on Electroconvulsive Therapy Application' published by the Ministry of Health with the approval number 28.11.2006/9190 is used. It explains the standards of ECT application in all psychiatry patients and involves no specific section regarding ECT application in child and adolescent psychiatry. Some of the legal regulations specified in the directive are as follows (Ministry of Health 2006):

a) ECT without anesthesia and muscle relaxants cannot be

administered unless the medical justification is indicated in the patient's file.

- b) ECT applications are performed under the responsibility of a trained mental health specialist. At least a mental health and diseases specialist, anesthesia and reanimation specialist, nurse, and anesthesia technician work in the ECT unit during the ECT application.
- c) The form or forms indicating that the ECT and anesthesia application is approved must be signed by the patient, his/her parent or guardian, or one of the first-degree relatives. In cases of medical obligations where no relatives of the patient can be reached, ECT treatment can be administered if the decision of two psychiatrists is documented.

Special committees consisting of specialists on ECT applications are established in various countries and these committees meet regularly to develop guidelines for the standardization and improvement of these applications. In particular, legal acts are made within the framework of patient rights regarding the approval process (NICE 2009). In the guideline prepared for ECT application in the UK (ECT Accreditation Service (ECTAS), 2020), it is reported that the evaluation and approval of a second specialist are required for all individuals aged under 18, even if the patient and family consent are taken. In the United States of America, for those aged under 13, the evaluation and approval of a second specialist are required for ECT although the patient's consent is obtained; a court decision is required for patients without consent (New York State Office of Mental Health, 2007). In legal acts prepared by the countries, it is seen that there is no comprehensive regulation for child and adolescent psychiatric patients and that the regulations are limited to a few items. Due to the increasing number of ECT applications in child and adolescent psychiatry, countries should make legal arrangements to cover this population. In this context, it is important for mental health professionals to fulfill their roles as patient rights advocates (De Meulenaere et al. 2018, Bilginer and Karadeniz 2019).

### **Nursing Care in ECT Application**

Psychiatric nurses are with the patient at every stage of ECT applications and should make appropriate attempts for this treatment method at the right time (ECTAS 2020). In the international guidelines, the presence of well-equipped ECT nurses working in ECT units draws attention. In the guidelines of the countries, it is stated that there should be an ECT nurse in psychiatry clinics and that the ECT nurse should have clinical experience and high knowledge and skills specific to this field (British Columbia Ministry of Health Services 2002, National Services Scotland (NHS Scotland) 2010, ECTAS 2020). According to UK (ECTAS 2020) and Scotland (NHS Scotland 2010) ECT guidelines, ECT nurses should have at least three years of psychiatric nursing experience and have been regularly participated in training programs related to ECT for three years. The nurses who completed the training program should be regularly supervised for their competencies, should pass these

supervisions successfully, should have participated in at least 20 sessions of ECT, and have to document all of these. Furthermore, it is reported that a second psychiatric nurse who will assist the ECT nurses during the ECT application should be involved and that this nurse should attend certain training programs and gain knowledge and skills in this field (NHS Scotland 2010, ECTAS 2020). In this respect, it is important for psychiatric nurses in our country to have ETC knowledge, skills, and competency. Psychiatric nurses working in ECT units should have information about the drugs used in ECT and their side effects, EEG (electroencephalogram), basic life support skills, and consent and status for ECT application and provide nursing care accordingly (ECTAS 2020). No information about nursing care for ECT in children and adolescents is available in the literature. Therefore, this section was gleaned by considering nursing care for ECT in adults with mental disorders.

### **Pre-ECT Nursing Care**

- When ECT is requested, the psychiatric nurse should first give the patient and his/her family the opportunity to explain their beliefs about ECT. Families may believe that ECT is referred to as "electric" or "shock" therapy and the child, adolescent, and/or family may consider the application a punishment or torture (ECTAS 2020).
- The psychiatric nurse should prepare a training plan that will reduce the misconceptions of the child, adolescent, and/or family, and contain information about the effects, side effects, and plan of the treatment. An appropriate training plan should be prepared for the age and developmental period characteristics of children and adolescents and easy-to-understand written and visual training materials should be used (Townsend 2015, ECTAS 2020).
- It will be effective to truly explain to the child and adolescent about what will happen during hospitalization or ECT application (ECTAS 2020).
- It is an effective method to introduce the hospital and clinic in the pre-ECT period for the psychological preparation of the child, adolescent, and/or family (Townsend 2015).
- The fears and anxieties of the child, adolescent, and/or family about treatment should be discussed and their anxiety levels should be evaluated. Techniques to cope with anxiety, relaxation techniques, and breathing exercises should be taught to the child, adolescent, and/or family (NHS Scotland 2010, Townsend 2015, ECTAS 2020).

### **One day before the therapy:**

- The wrist guard of the child and adolescent should be checked and the patient should be told not to remove the wrist guard. If the patient has any allergies, he/she should also wear an allergy wrist guard (Dönmez and Yılmaz 2011, ECTAS 2020).
- The child and adolescent's short-term and long-term memory should be evaluated and recorded (ECTAS 2020).
- The patient's medical records should be examined, consent documents (anesthesia consent document, ECT consent document), patient evaluation forms (physical diagnosis form

for cardiovascular, neurological, and respiratory systems, mental state examination form, patient's hemogram findings, chest radiography, ECG, drug allergies, etc.) should be checked (British Columbia Ministry of Health Services 2002, Dönmez and Yılmaz 2011, ECTAS 2020).

- The patient and his/her family should be informed that food and fluids should be restricted 6-8 hours before the therapy, and the child and adolescent should be monitored (British Columbia Ministry of Health Services 2002).
- Drugs and materials (such as emergency resuscitation equipment, oxygen and aspiration systems) in the treatment room where ECT will be performed should be checked and appropriate preparations should be made (British Columbia Ministry of Health Services 2002).

#### Day of Therapy

- The child's and adolescent' glasses, contact lenses, hairpins, jewelry, nail polish should be removed, if any, they should be kept safely or delivered to the family by keeping a record (Dönmez and Yılmaz 2011, Townsend 2015).
- One hour before going to the ECT unit or room, the patient's vital signs should be examined and recorded (Dönmez and Yılmaz 2011, Kavanagh and McLoughlin 2009).
- If the child and adolescent have a chronic disease (rhythm disorder, etc.), the drug should be given with a few sips of water (Kavanagh and McLoughlin 2009, Townsend 2015).
- The child and adolescent should be questioned about the time of his/her last meal and the time should be recorded (Dönmez and Yılmaz 2011, Kavanagh and McLoughlin 2009).
- It should be ensured that the child and adolescent go to the toilet and empty their bladder to avoid incontinence during the procedure (ECTAS 2020).
- Vascular access should be established; the child and adolescent should be given hospital coats, gowns, or comfortable clothes and be appropriately transferred to the treatment room (Dönmez and Yılmaz 2011, Townsend 2015).
- The nurse should be with the patient throughout the treatment to reduce the fear and tension of the child and adolescent about ECT (Townsend 2015).

#### Nursing Care During ECT

- The psychiatric nurse must participate in the ECT session. To reduce the anxiety of the child and adolescent, who is transferred to the treatment room, he/she should introduce the patient to the treatment team and introduce the treatment room to the child and adolescent. In addition, informing the patient that he/she will always be there during the procedure and explaining the process to the patient before the procedures will reduce the anxiety of the child and adolescent (Kavanagh and McLoughlin 2009, Dönmez and Yılmaz 2011).
- Shoes of the child and adolescent should be taken off; the patient should be placed on a stretcher, be monitored; his/her vital signs should be measured and recorded (ECTAS 2020).

- Before starting the procedure, a cuff should be placed on one arm of the child and adolescent and the effectiveness of ECT should be monitored (Kavanagh and McLoughlin 2009, ECTAS 2020).
- The child and adolescent should be informed that the procedure will be initiated and that anesthesia and muscle relaxants will be given (ECTAS 2020).
- The arms and legs of the child and adolescent should be supported throughout the procedure and airway patency should be maintained (NHS Scotland 2010, ECTAS 2020).
- The type and duration of the epileptic seizure occurring during application should be monitored and recorded (NHS Scotland 2010, ECTAS 2020).

#### Post-ECT Nursing Care

- After the application, oxygen should be given to the patient and airway patency should be maintained to ensure spontaneous breathing and comfortable breathing of the child and adolescent (NHS Scotland 2010, Dönmez and Yılmaz 2011).
- The vital signs of the child and adolescent should be measured and recorded in order to compare the pre- and post-application vital signs (NHS Scotland 2010, Dönmez and Yılmaz 2011).
- The child and adolescent should be safe by removing the side rails in order for them not to experience trauma (ECTAS 2020).
- It is necessary to wait until cooperation is achieved in order to awaken and orient the child and adolescent and the patient should be evaluated whether any complications and side effects develop. If the child or adolescent has memory confusion, he/she should be informed that this will end within a few weeks to reduce his/her anxiety (British Columbia Ministry of Health Services 2002, NHS Scotland 2010).
- After fully awakening the child and adolescent, a nurse should accompany the transfer from the treatment room to the patient's room (Kavanagh and McLoughlin 2009, NHS Scotland 2010).
- The family waiting for the child and adolescent should be informed and their questions should be answered (Kavanagh and McLoughlin 2009, NHS Scotland 2010).

#### Conclusion

Although ECT has been used for nearly a century, it is still controversial due to common prejudices among both society and health professionals (Donohue and Keogh 2020). Mental health professionals' limited level of knowledge and negative attitudes about ECT can be explained by the limited number of studies evaluating the effectiveness of ECT in child and adolescent psychiatry (Bilginer and Karadeniz 2019, Donohue and Keogh 2020). For this reason, it is important to provide ECT training to individuals in the community and mental health professionals and explain mental disorders and their

treatments in order to remove obstacles in treatment. The presence of trained ECT nurses with sufficient knowledge and skills in psychiatry clinics is extremely important in eliminating the prejudices and fears of children, adolescents, and/or their families, reducing side effects, and in patient follow-up. In this regard, it can be recommended to organize postgraduate “ECT Nursing” certificate programs for psychiatric nurses in our country, standardize these programs, and introduce the concept of “ECT Nursing” to our country. Making legal regulations for ECT application in child and adolescent psychiatry, which is a special field, and ensuring mental health professionals fulfill their roles as advocates for patient rights are other important issues. With the legal regulations established, ECT application should be provided according to certain standards in child and adolescent psychiatry and the legal rights of the children, adolescents, and/or families should be identified. In this process, it is inevitable for psychiatric nurses to have comprehensive knowledge of ECT application and nursing care. It can be recommended to carry out studies on ECT application and nursing care in our country and contribute to the literature.

**Authors Contributions:** *The authors attest that she has made an important scientific contribution to the study and has assisted with the drafting or revising of the manuscript.*

**Peer-review:** *Externally peer-reviewed.*

**Conflict of Interest:** *No conflict of interest was declared by the authors.*

**Financial Disclosure:** *The authors declared that this study has received no financial support.*

## References

Akçan PE, Tekgül N, Karademirci E, Kurtuluş Ö (2012) Ergenlik dönemi: fiziksel büyüme, psikolojik ve sosyal gelişim süreci. *Journal of Turkish Family Physician*, 3:10-16.

American Academy of Child and Adolescent Psychiatry (AACAP) (2004) Practice parameter for use of electroconvulsive therapy with adolescents. *J Am Acad Child Adolesc Psychiatry*, 43:1521-1539.

Balhara YPS, Mathur S (2012) ECT prohibition for children and adolescents in mental health care act of India: A step in the right direction? *J ECT*, 28:1-2.

Başgül ŞS, Luş MG, Hashimov A (2020) Electroconvulsive therapy in an adolescent with bipolar disorder, substance use, and body dysmorphic disorder comorbidity: case report. *Neurocase*, 26:51-54.

Benson NM, Seiner SJ (2019) Electroconvulsive therapy in children and adolescents: clinical indications and special considerations. *Harv Rev Psychiatry*, 27:354-358.

Bilginer Ç, Karadeniz S (2019) Knowledge, attitudes, and experience of child and adolescent psychiatrists in Turkey concerning pediatric electroconvulsive therapy. *Asian J Psychiatr*, 46:74-78.

Bloch Y, Linder M, Kalman N, Koubi M, Gal G, Nitsan U et al. (2018) Adult and adolescent patient evaluations of electroconvulsive therapy in comparison to other therapeutic modalities. *J ECT*, 34:45-49.

British Columbia Ministry of Health Services (2002) Electroconvulsive Therapy Guidelines For Health Authorities in British Columbia. Vancouver, BC, British Columbia Ministry of Health Services.

De Meulenaere M, De Meulenaere JD, Ghaziuddin N, Sienaert P (2018) Experience, knowledge, and attitudes of child and adolescent

psychiatrists in Belgium toward pediatric electroconvulsive therapy. *J ECT*, 34:247-252.

Dennis NM, Dennis PA, Shafer A, Weiner RD, Husain MM (2017) Electroconvulsive therapy and all-cause mortality in Texas, 1998-2013. *J ECT*, 33:22-25.

Dhossche DM, Withane N (2019) Electroconvulsive therapy for catatonia in children and adolescents. *Child Adolesc Psychiatr Clin N Am*, 28:111-120.

Donohue G, Keogh B (2021) Do we need to revisit our thinking on Electroconvulsive Therapy? *J Psychiatr Ment Health Nurs*. 28:307-308.

Dönmez ÇF, Yılmaz M (2011) Elektrokonvülsif tedavi ve hemşirelik bakımı. *Psikiyatri Hemşireliği Dergisi*, 2:80-89.

ECT Accreditation Service (ECTAS) (2020) ECT Accreditation Service (ECTAS) Standards for the Administration of ECT, 15th edition. London, ECT Accreditation Scheme (ECTAS).

García-Carrión R, Villarejo-Carballido B, Villardón-Gallego L (2019) Children and adolescents mental health: a systematic review of interaction-based interventions in schools and communities. *Front Psychol*, 10:918.

Grover S, Malhotra S, Varma S, Chakrabarti S, Avasthi A, Mattoo SK (2013) Electroconvulsive therapy in adolescents: A retrospective study from North India. *J ECT*, 29:122-126.

Grover S, Varadharajan N, Avasthi A (2017) A qualitative study of experience of parents of adolescents who received ECT. *Asian J Psychiatr*, 30:109-113.

Hızlı SG, Özten E, Eryılmaz G, Göğçeğöz I, Ceylan ME (2014) Elektrokonvülsif tedavi üzerine güncel bir gözden geçirme. *Psikiyatride Güncel Yaklaşımlar*, 6:107-125.

Karayağmurlu A, Coşkun M, Elboğa G, Ghaziuddin N, Karayağmurlu E, Gökçen C et al. (2020) Efficacy and safety of electroconvulsive therapy in adolescents a retrospective chart review study from Turkey. *J ECT*, 36:54-59.

Kavanagh A, McLoughlin DM (2009) Electroconvulsive therapy and nursing care. *Br J Nurs*, 18:1370-1377.

Leiknes KA, Schweder LJ, Høie B (2012) Contemporary use and practice of electroconvulsive therapy worldwide. *Brain Behav*, 2:283-344.

Lima NNR, Nascimento VB, Peixoto JAC, Moreira MM, Neto MLR, Almeida JS et al. (2013) Electroconvulsive therapy use in adolescents: A systematic review. *Ann Gen Psychiatry*, 12:17.

Loiseau A, Harrisson MC, Beaudry V, Patry S (2017) Electroconvulsive therapy use in youth in the province of Quebec. *J Can Acad Child Adolesc Psychiatry*, 26:4-11.

Lu C, Li Z, Patel V (2018) Global child and adolescent mental health: The orphan of development assistance for health. *PLoS Med*, 15:e1002524.

Mitchell S, Hassan E, Ghaziuddin N (2018) A follow-up study of electroconvulsive therapy in children and adolescents. *J ECT*, 34:40-44.

NICE (2009) Guidance on the Use of Electroconvulsive Therapy. London, National Institute for Health and Care Excellence.

NICE (2019) Depression in Children And Young People: Identification and Management. London, National Institute for Health and Care Excellence.

National Services Scotland (NHS Scotland) (2010) Scottish ECT Accreditation Network Standards. Edinburgh, National Services Scotland.

New York State Office of Mental Health (2007) Guidance on Electroconvulsive Therapy (ECT). New York, New York State Office of Mental Health.

Önder A, Sürer AA, Doğan Y, Bilaç Ö, Kavurma C (2018) Ergen grupta elektrokonvülsif tedavi kullanımı olgu sunumu. *Dusunen Adam*, 31:201-204.

Parker M, Hunt J (2019) Electroconvulsive therapy: A review. *Brown University Child and Adolescent Behaviour Letter*, 35:1-6.

Puffer CC, Wall C, Huxsohl JE, Frye MA (2016) A 20 year practice review of electroconvulsive therapy for adolescents. *J Child Adolesc Psychopharmacol*, 26:632-636.

Türkiye Psikiyatri Derneği (2018) Ruh Sağlığı Yasası Taslağı. Available from <https://www.psikiyatri.org.tr/uploadFiles/2811201717434-Ruh-Sagligi-Yasa-Taslagi.pdf> (Accessed 15.11. 2020).

Sachs M, Madaan V (2012) *Electroconvulsive Therapy in Children and Adolescents: Brief Overview and Ethical Issues*. Washington DC, American Academy of Child and Adolescent Psychiatry.

Sağlık Bakanlığı (2006) *Elektrokonvulsif Tedavi Uygulama Yönergesi*. Ankara, Sağlık Bakanlığı.

Shoirah H, Hamoda HM (2011) Electroconvulsive therapy in children and adolescents. *Expert Rev Neurother*, 11:127-137.

Shorter E (2014) The history of pediatric ECT. In *Electroconvulsive Therapy in Children and Adolescents*. (Eds N Ghaziuddin, G Walter):1-7. Oxford, University Press.

Stein ALS, Sacks SM, Roth JR, Habis M, Saltz SB, Chen C (2020) Anesthetic management during electroconvulsive therapy in children: A systematic review of the available literature. *Anesth Analg*, 130:126-140.

Townsend MC (2015) Electroconvulsive therapy. In *Psychiatric Mental Health Nursing: Concepts of Care in Evidence-Based Practice*. (Ed MC Townsend):310-316. Philadelphia, F.A. Davis Company.

Wachtel LE, Dhossche DM, Kellner CH (2011) When is electroconvulsive therapy appropriate for children and adolescents?. *Med Hypotheses*, 76:395-399.

Wachtel LE, Hermida A, Dhossche DM (2010) Maintenance electroconvulsive therapy in autistic catatonia: a case series review. *Prog Neuropsychopharmacol Biol Psychiatry*, 34:581-587.

Wachtel LE, Shorter E, Fink M (2018) Electroconvulsive therapy for self-injurious behaviour in autism spectrum disorders: Recognizing catatonia is key. *Curr Opin Psychiatry*, 31:116-122.

Walter G, Robertson M, Rey JM, Soh N, Malhi GS (2010) Electroconvulsive therapy in young people and the pioneering spirit of Laretta Bender. *Acta Neuropsychiatr*, 22:253-254.

Wang S, Yang C, Jia J, Zhou Y, Zheng Y (2018) Use of electroconvulsive therapy in adolescents with schizophrenia in China. *Child Adolesc Psychiatry Ment Health*, 12:49.

Watts BV, Groft A, Bagian JP, Mills PD (2011) An examination of mortality and other adverse events related to electroconvulsive therapy using a national adverse event report system. *J ECT*, 27:105-108.

World Health Organization (WHO) (2020) Improving the mental and brain health of children and adolescents. <https://www.who.int/activities/improving-the-mental-and-brain-health-of-children-and-adolescents> (Accessed 15.11. 2020).

Zhang QE, Wang ZM, Sha S, Ng CH, Seiner SJ, Welch CA (2016) Common use of electroconvulsive therapy for Chinese adolescent psychiatric patients. *J ECT*, 32:251-255.

Zhang ZJ, Chen YC, Wang HN, Wang HH, Xue YY, Feng SF et al. (2012) Electroconvulsive therapy improves antipsychotic and somnographic responses in adolescents with first-episode psychosis: a case-control study. *Schizophr Res*, 137:97-103.

Zong QQ, Qi H, Wang YY, Zhang C, Balbuena L, Ungvari GS (2020) Knowledge and attitudes of adolescents with psychiatric disorders and their caregivers towards electroconvulsive therapy in China. *Asian J Psychiatr*, 49:101968.