

THE IMPORTANCE OF REHABILITATION IN CHILDREN WITH HEART DEFECTS AFTER SURGERY

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Abstract

Congenital heart disease is the most common neonatal congenital defect. The variety and severity of clinical manifestations depend on the heart structures and their functional impact [1]. According to analyses, 8-10 out of every 1,000 infants are born with congenital heart defects worldwide. 72% of them require surgery in the first year of life. Through timely surgeries, 97% of these young patients can return to a healthy life [9].

Introduction

Congenital heart disease constitutes nearly one-third of all major congenital anomalies. The incidence of congenital heart disease varies across the world and over time; however, reviews on this topic are still incomplete. This systematic review includes 114 articles that encompass 24,091,867 live-born infants, with a total sample of 164,396 individuals. According to reports, the overall prevalence of cardiovascular diseases has significantly increased over time: from 0.6 to 9.1 per 1,000 live births between 1930 and 1934. The highest incidence of cardiovascular disease at birth has been reported in Asia, with 9.3 per 1,000 live births [2].

Currently, congenital heart disease accounts for approximately 0.8 per thousand live births worldwide, or around 40,000 infants annually. In 2017, this global phenomenon was 17.9 per thousand live births, 19.1 per thousand for boys and 16.6 per thousand for girls. However, the types and severity of this disease vary greatly [10]. After surgery, children frequently report problems such as surgical wounds and drainage pain, persistent neck, shoulder, and chest pain, breathing and excretion difficulties, physical weakness, and sleep disturbances like insomnia and nightmares. Additionally, issues like feeding problems and depression are common [11].

One of the primary reasons for rehabilitation after surgery is the disruption of the nervous system's blood supply, resulting in decreased oxygen and nutrient delivery [11,12,13].

Children with congenital heart disease often have a sedentary lifestyle and motor deficits from infancy. The least active infants often grow into the least active children at school age. Increasing physical activity during the infant stage while treating congenital heart disease may prevent sedentary lifestyle habits. Active play is very important for young children (4-5) as it forms the foundation for socialization during childhood, provides emotional, psychological, and cognitive benefits [5], and is essential for children's health [6], biological and psychosocial development [4,5]. Various studies on physical activity emphasize that maintaining good physical fitness through an active lifestyle is crucial for this group of patients. This is especially important as, compared to healthy peers, they face an increased risk of cardiovascular disease

later in life. Children with congenital heart defects, whether simple or complex, are often less active [3]. and cannot achieve the recommended 180 minutes of daily activity for optimal health [2,3], even if they possess age-appropriate motor skills. Very inactive infants with congenital heart disease grow into the least active children at school age [11], suggesting that interventions to enhance active play should target infants with congenital heart disease. Physical activity interventions for young children with congenital heart disease are a new area, and several theoretical issues have been identified. The most important factor is whether parents are willing to engage their children in such interventions. Two years after surgery for congenital heart disease, children and adolescents are typically less active than their developing peers. Most children and adolescents fail to meet health guidelines for physical activity and do not receive physiotherapy after surgery. Cardiac rehabilitation is necessary after open-heart surgery. Data indicate that post-operative cardiac rehabilitation positively impacts the optimal growth and development of children [10]. There is a clear need for additional and individualized physiotherapy support after cardiac surgery to optimize physical fitness. Therefore, close collaboration between pediatric cardiologists and physiotherapists is essential for creating well-structured rehabilitation programs aimed at improving physical activity and fitness [6].

Patients with congenital heart defects and their families require more information and support to encourage physical activity and fitness after heart surgery. A well-designed and supportive rehabilitation program should be incorporated (individual) to improve physical activity and fitness during the post-operative period [6].

In addition to concerns related to physical health and activity levels, children with heart disease may be at risk for neurodevelopmental and socio-emotional adaptation challenges. Children with congenital heart defects requiring early surgical intervention are at risk for developmental delays and cognitive impairments, as are those with cardiomyopathies, who may also face socio-emotional issues. As a result, rehabilitation efforts to improve these patients' physical well-being and adaptation outcomes are receiving more attention. However, unlike for adult patients, no standard rehabilitation programs are currently available for children with heart disease [14].

Even with simple defects, factors such as cardiac arrest [14, 15] and extracorporeal membrane oxygenation [14, 16] can increase the risk of neurodevelopmental delays. Therefore, children with cardiovascular disease may benefit from rehabilitation and recovery services during acute care following surgical interventions, cardiac arrest, and extracorporeal membrane oxygenation, as well as during monitoring for functional impairments or developmental delays during childhood.

According to the guidelines of the American Heart Association and the American Association for Cardiovascular and Pulmonary Rehabilitation, cardiac rehabilitation programs for adolescents and adults include several key components, such as initial assessment, management of health risk factors (e.g., diabetes, hypertension, lipid levels), counseling on nutrition, physical exercise, and physical activity, as well as psycho-social management. Similarly, the primary goals of pediatric cardiac rehabilitation are to manage physical health and activity, as

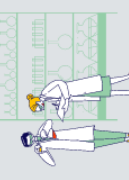
well as socio-emotional functioning. Special attention may be given to mitigating developmental and cognitive delays, which are not the main focus of adult cardiac rehabilitation. Cardiac rehabilitation programs help not only to alleviate the physiological impacts of heart disease but also to enhance patients' socio-emotional and cognitive functioning. Thus, cardiac rehabilitation programs assist children, adolescents, and young people in returning to family life, peer groups, school, and work environments after hospitalization. In addition to teaching physical exercises and providing appropriate physical activity counseling, pediatric cardiac rehabilitation programs help patients and their families develop nutrition plans and better manage the symptoms of their heart condition. Therefore, these programs can promote healthy lifestyles and reduce the risk and severity of future cardiovascular diseases [14].

By identifying the needs of patients, mental health providers can implement interventions aimed at fostering healthy behaviors and adherence to treatment, as well as addressing problems related to serious illness and prolonged hospital stays. For instance, motivational interviewing strategies can help cultivate the willingness to engage in adaptive behaviors, such as medication adherence and following nutrition and exercise plans [17]. Behavioral management therapy strategies can target symptoms of sadness manifested in children, while cognitive-behavioral and mindfulness-based therapies can effectively improve anxiety, nervousness, and depressive moods in older children and adolescents [18,19].

In conclusion, rehabilitation programs for children after heart surgery provide an effective solution for physical, medical, and psycho-emotional support for the child and their family. Such programs are crucial for ensuring that children do not fall behind their peers both physically and emotionally, reduce the duration of hospital stays, and minimize post-surgical complications.

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