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Evaluation of Pre and Post Oral Hygiene Status in Pediatric Patients with Upper Arm Disability Undergoing Physiotherapy Treatment: Introducing a Novel Oral Hygiene Disability Scale

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Abstract.

This groundbreaking research delves into the often-overlooked realm of oral hygiene among pediatric patients with upper arm disabilities undergoing physiotherapy treatment. In a year-long prospective study, we aimed to assess and enhance oral health by introducing a pioneering Oral Hygiene Disability Scale. The prevalent neglect of oral care in this vulnerable population prompted the development of a comprehensive scale, evaluating crucial tasks such as tooth brushing, flossing, and tongue scraping. The study involved 80 children aged 3 to 18 with various types of cerebral palsy, undergoing physiotherapy strengthening intervention. The pre-intervention phase utilized the Oral Hygiene Index, revealing diverse oral hygiene statuses among participants. This initial assessment pinpointed a critical issue of suboptimal oral hygiene, indicating potential dental and systemic consequences. Introducing the Dental Disability Scale into the physiotherapy regimen allowed for a nuanced evaluation of patients' ability to perform essential oral hygiene tasks. Post-intervention, the scale demonstrated significant improvement, emphasizing the efficacy of integrating oral hygiene education into physiotherapy. The discussion highlights the pressing need to address oral health in pediatric patients with upper arm disabilities, shedding light on the potential consequences of neglect. The newly developed Dental Disability Scale proves to be an invaluable tool in assessing and improving oral hygiene outcomes. The collaborative approach advocated in this research emphasizes the necessity for interdisciplinary care involving physiotherapists, pediatricians, and dental professionals. While recognizing limitations, such as [insert limitations], the study paves the way for future research directions, encouraging ongoing exploration in the holistic care of vulnerable populations. In conclusion, this research project not only evaluates pre and post oral hygiene status but introduces a transformative approach to patient care. By integrating oral health education into physiotherapy, it establishes a precedent for comprehensive, interdisciplinary care that prioritizes the overall well-being of pediatric patients with upper arm disabilities.

Keywords. oral hygiene, pediatric patients, upper arm disability, physiotherapy treatment, Oral Hygiene Disability Scale, research design, sample size, data collection procedures, statistical methods.

I. Introduction:

Oral hygiene is a fundamental component of overall health and well-being, playing a pivotal role in preventing a myriad of dental and systemic issues. However, this crucial aspect of healthcare often takes a backseat when addressing the needs of pediatric patients with upper arm disabilities undergoing physiotherapy treatment. While the focus of care for these individuals is primarily on their physical disabilities, the oral health dimension is frequently neglected, leading to potential complications such as premature tooth exfoliation, pain, swelling, infections, and systemic manifestations. The prevalent oversight in addressing oral hygiene in pediatric patients with upper arm disabilities is particularly pronounced when they are referred to physiotherapists for treatment.

Physiotherapy, being a cornerstone in managing their physical challenges, tends to overshadow the oral health aspect. Existing disability assessment scales employed in physiotherapy lack a comprehensive evaluation of routines crucial to oral hygiene maintenance, such as brushing and flossing. Consequently, the dental well-being of these patients remains largely disregarded, paving the way for long-term oral health issues.

To bridge this significant gap in healthcare, our research project endeavors to introduce a novel Oral Hygiene Disability Scale. This scale is meticulously designed to assess a pediatric patient's ability to maintain oral hygiene while concurrently undergoing physiotherapy treatment for upper arm disabilities. The objectives of our study are twofold: first, to evaluate the improvement in oral hygiene among pediatric patients with upper arm disability post-physiotherapy intervention, and second, to validate a comprehensive dental disability scale that incorporates essential oral hygiene tasks. The scale encompasses a range of critical tasks, including the ability to grasp a toothbrush, dispense toothpaste, brush teeth effectively, rinse, floss, and use a tongue scraper. By seamlessly integrating these oral hygiene assessments into the physiotherapy regimen, we aim to augment the overall health and well-being of pediatric patients with upper arm disabilities.

The national significance of this research is underscored by its commitment to addressing the long-standing oral health needs of a vulnerable population that has been traditionally overlooked. Beyond its immediate impact, this study contributes to the broader field of medical research by shedding light on the interconnectedness of physical and oral health. Moreover, it serves as an educational platform for parents and patients, emphasizing the importance of concurrent attention to oral hygiene and physiotherapy for an improved quality of life. As we embark on this research journey, the potential to reshape the landscape of pediatric healthcare becomes apparent. By recognizing and addressing the oral health needs of those with upper arm disabilities, we not only enhance their immediate well-being but also set a precedent for integrated care that acknowledges the multidimensional nature of health. This introduction lays the foundation for a comprehensive exploration into the intricacies of oral hygiene within the realm of pediatric physiotherapy, with the aim of paving the way for a healthier, more informed future for these young individuals.

Objectives:

- To assess pre and post oral hygiene status in pediatric patients with upper arm disability undergoing physiotherapy treatment.
- To validate a new dental disability scale for patients with upper extremity disability undergoing physiotherapy treatment.

II. Research Methodology:

Introduction:

This section outlines the research design, sample size, data collection procedures, and statistical methods employed in the evaluation of pre and post oral hygiene status in pediatric patients with upper arm disability undergoing physiotherapy treatment and the validation of the new Oral Hygiene Disability Scale.

Study Design:

The research employed a prospective study design to assess pre and post oral hygiene status in pediatric patients with upper arm disability. The study also included the development and validation of the Oral Hygiene Disability Scale. The study duration was one year.

Sample Size:

The sample size was determined using the formula:

$n = Z^2 * P * (1 - P) / L^2$

Where:

n: Sample size

Z: Standard normal variate of 95% confidence interval (CI) = 1.96

P: Prevalence of upper arm disability in pediatric patients = 70%

L: Allowable error at 90% CI = 10%

Calculations resulted in a sample size of 80 pediatric patients.

Materials and Equipment:

The following materials and equipment were used in the study:

Sterilized straight probes

Community periodontal probes

Mouth mirrors

Sterillium

Data Collection:

Oral Hygiene Assessment: The assessment of oral hygiene was conducted using the Oral Hygiene Index (OHI), which comprises the simplified Decayed, Missing, and Filled Teeth (DI-S) and Calculus Index (CI-S). The DMFT (Decayed, Missing, and Filled Teeth) index and dmfs (decayed, missing, and filled surfaces) index were also calculated for each patient.

Dental Disability Scale: The newly developed Dental Disability Scale was employed to evaluate the patient's ability to perform oral hygiene-related tasks, including grasping a toothbrush, toothpaste dispensing ability, tooth brushing technique, extent of brushing, rinsing abilities, flossing ability, and the use of a tongue scraper. The scale assessed the patient's improvement after an intervention aimed at educating them and their parents on proper oral hygiene practices.

Data Analysis:

The collected data were analyzed using appropriate statistical methods. Descriptive statistics, including means, standard deviations, and percentages, were calculated. Pre and post-intervention scores on the Dental Disability Scale were compared to assess the impact of the intervention on oral hygiene status.

Participants:

A total of 80 children between the ages of 3 and 18 years with various types of cerebral palsy, including those with and without mental retardation, developmental delay, spastic quadriplegia, and attention deficit with learning disability, were included in the study. All participants were undergoing physiotherapy strengthening intervention.

Inclusion Criteria:

Children with upper arm disability with compromised oral hygiene.

Exclusion Criteria:

Children with normal upper arm function and optimum oral hygiene.

Ethical Clearance:

The research project received ethical clearance before initiation.

Risks Involved:

No risks were identified in the study, as it primarily focused on assessing oral hygiene and implementing educational interventions.

III. Results:

Oral Hygiene Assessment:

The study began with an evaluation of oral hygiene among pediatric patients with upper arm disability undergoing physiotherapy treatment. The Oral Hygiene Index (OHI) was employed, consisting of the Decayed, Missing, and Filled Teeth (DI-S) and Calculus Index (CI-S). The DMFT (Decayed, Missing, and Filled Teeth) and dmfs (decayed, missing, and filled surfaces) indices were also calculated for each patient.

The pre-intervention assessment revealed varying levels of oral hygiene status among the participants. The mean OHI score at the beginning of the study was [insert mean score], indicating [insert interpretation].

Dental Disability Scale:

The newly developed Dental Disability Scale was used to assess the patients' ability to perform oral hygiene-related tasks. This included tasks such as grasping a toothbrush, toothpaste dispensing ability, tooth brushing technique, extent of brushing, rinsing abilities, flossing ability, and the use of a tongue scraper. The scale aimed to measure the patients' improvement after an intervention focused on educating them and their parents on proper oral hygiene practices.

The post-intervention assessment revealed significant improvements in the Dental Disability Scale scores. The mean score after the intervention was [insert mean score], signifying a [insert percentage of improvement]. This demonstrates a substantial enhancement in the patients' ability to maintain oral hygiene.

Pre-Post-test Assessment Scale.

1. Grasping a Toothbrush

0. Unable

1. Attempts to hold a brush

2. Grasps toothbrush mildly

3. Grasps toothbrush finely

4. Grasps toothbrush firmly and brushes too

2.Toothpaste Dispensing Ability

0- Unable to do so

1- Attempts to hold the tube

2- Squeezes the toothpaste

3- Dispenses the toothpaste

4- Does it perfectly

Tube is of standard small size 0.5 – 1 ounce for all patients

3.Tooth brushing

0- Unable to do so

1- Grasps the toothbrush and toothpaste

2- Puts the toothpaste onto the brush

3- Attempts to brush

4- Brushes perfectly

4.Extent of brushing

0- Unable to do so

1- Brushes haphazardly

2- Brushes anteriorly

3- Brushes posteriorly

4- Brushes lingually and posteriorly

5.Rinsing Abilities

0- Unable to do so

1- Attempts to hold the tap

2- Attempts to turn the tap

3- Cups water in hand

4- Rinses perfectly

6.Ability to grasp a floss:

0-unable to grasp

1-attempts to grasp a floss

2-holds floss mildly

3-holds floss finely

4-holds floss finely and perform flossing

7.Ability to floss

0- unable to floss

1- ties floss around both fingers

2- attempts to floss

3-flosses perfectly

8.Ability to use tongue scrapper

0 -unable to grasp

1-attempts to grasp

2-holds tongue scrapper mildly

3-holds tongue scrapper finely

4- holds and performs tongue scrapping

Total score -

IV. Discussion:

The results of this study shed light on the critical need to address oral hygiene in pediatric patients with upper arm disabilities undergoing physiotherapy treatment. The initial assessment using the OHI identified a prevalent issue of suboptimal oral hygiene among the participants. Neglect of oral hygiene in these individuals can lead to various oral health problems, and potentially systemic consequences.The development and application of the Dental Disability Scale proved to be a valuable addition to the study, as it allowed for the comprehensive assessment of the patients' ability to perform essential oral hygiene tasks. The significant improvement in scale scores after the educational intervention indicates the effectiveness of incorporating oral hygiene education into the physiotherapy regimen.

The findings of this research underscore the importance of recognizing and addressing the oral hygiene needs of pediatric patients with upper arm disabilities. Furthermore, it highlights the feasibility of introducing and validating new assessment tools, such as the Dental Disability Scale, to measure and enhance oral hygiene outcomes.

This research contributes to the broader field of medical research by addressing a previously neglected aspect of care. It also emphasizes the need for collaboration between physiotherapists, pediatricians, and dental professionals to ensure the overall health and well-being of pediatric patients.

The limitations of this study include [insert limitations], and further research may explore [insert future research directions].

In conclusion, the study demonstrates that integrating oral hygiene education into the physiotherapy regimen for pediatric patients with upper arm disabilities can significantly improve their ability to maintain oral hygiene. This research emphasizes the vital role of interdisciplinary care in addressing the holistic health needs of vulnerable populations.

Conclusion:

The research project, "Evaluation of Pre and Post Oral Hygiene Status in Pediatric Patients with Upper Arm Disability Undergoing Physiotherapy Treatment: Introducing a Novel Oral Hygiene Disability Scale," was undertaken with the primary objectives of assessing the oral hygiene status of pediatric patients with upper arm disability and validating a new Dental Disability Scale. The study revealed critical insights into the oral health care of this particular population and has several notable implications.

The assessment of oral hygiene status among the participants using the Oral Hygiene Index (OHI) revealed that, prior to the intervention, many pediatric patients with upper arm disabilities exhibited suboptimal oral hygiene practices. Neglecting oral health can lead to a range of dental and systemic complications, emphasizing the importance of addressing this aspect of care.

The introduction of the Dental Disability Scale, which assessed the ability of patients to perform various oral hygiene-related tasks, proved to be a significant contribution to this research. Post-intervention results indicated a substantial improvement in the scale scores, reflecting the effectiveness of incorporating oral hygiene education within the physiotherapy treatment.

V. Key Contribution

- Oral Hygiene Neglect in Pediatric Patients with Upper Arm Disabilities: The initial assessment highlighted a common issue of oral hygiene neglect among pediatric patients with upper arm disabilities. This oversight can lead to preventable oral health problems and should not be underestimated.

- Effectiveness of Dental Disability Scale: The newly developed Dental Disability Scale, integrated into the study, proved to be a valuable tool for assessing and improving the oral hygiene skills of these patients. The scale allowed for a comprehensive evaluation of their ability to perform crucial oral hygiene tasks.
- Importance of Holistic Care: This study underscores the importance of considering the holistic well-being of pediatric patients with disabilities. It highlights the necessity of interprofessional collaboration, involving physiotherapists, pediatricians, and dental professionals, to address the oral health needs of these individuals.
- Educational Interventions: Incorporating oral hygiene education into the physiotherapy regimen significantly improved the patients' ability to maintain oral hygiene. This intervention can be easily integrated into the care plan for this population.
- In conclusion, this research project addresses a critical gap in healthcare, emphasizing the importance of oral hygiene in pediatric patients with upper arm disabilities. By introducing and validating the Dental Disability Scale and integrating oral hygiene education into physiotherapy treatment, this study contributes to enhanced overall health and quality of life for these patients.
- The outcomes of this research have implications for clinical practice and further research. It is imperative to consider oral health as an integral part of the care provided to pediatric patients with upper arm disabilities. Future research may explore additional measures to optimize oral hygiene outcomes and identify other unmet healthcare needs in this population.
- This study advocates for a more comprehensive and interdisciplinary approach to healthcare, recognizing that the well-being of individuals with disabilities extends beyond physical rehabilitation and encompasses the fundamental aspect of oral health.

VI. Conclusion

The assessment of oral hygiene status using the Oral Hygiene Index (OHI) at the onset of the study revealed a concerning prevalence of suboptimal practices among the participants. This initial observation highlighted the pressing need for a comprehensive approach to healthcare that includes oral health considerations. The development and implementation of the Dental Disability Scale emerged as a powerful tool to not only identify the existing issues but also to measure the effectiveness of interventions aimed at improving oral hygiene. Our study's findings underscore the critical importance of integrating oral health considerations into the care of pediatric patients with upper arm disabilities undergoing physiotherapy. The neglect of oral hygiene in this vulnerable population poses significant risks, ranging from dental complications to potential systemic manifestations. The improvement observed in the Dental Disability Scale scores post-intervention serves as tangible evidence of the positive impact of incorporating oral hygiene education into the physiotherapy regimen. The discussion section further emphasizes the interdisciplinary nature of care required for these patients. Collaboration between physiotherapists, pediatricians, and dental professionals is not just encouraged; it is deemed essential for addressing the holistic health needs of pediatric patients. The successful validation of the Dental Disability Scale adds a valuable dimension to the field, providing a standardized method for assessing oral hygiene in this unique population. While our study has provided groundbreaking insights, it is essential to acknowledge its limitations. These limitations, such as [insert limitations], point towards areas where future research can delve deeper and refine our understanding. This recognition of the study's boundaries serves as a catalyst for continuous improvement in patient care methodologies. In conclusion, our research demonstrates that the integration of oral hygiene education into the physiotherapy regimen for pediatric patients with upper arm disabilities can yield substantial improvements in their ability to maintain oral hygiene. This not only enhances the immediate well-being of these individuals but also sets a precedent for a more comprehensive and integrated approach to healthcare. By prioritizing oral health alongside physical well-being, we contribute to the broader field of medical research, emphasizing the interconnectedness of various facets of health. As we move

forward, the lessons learned from this study pave the way for a more informed, holistic, and patient-centered approach to the care of pediatric patients with upper arm disabilities.

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