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Temporomandibular Disorder in Cases with Cleft Lip and Palate

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ABSTRACT

The most commonly used non pain complaint is Temporomandibular Disorders (TMD), a set of craniofacial pain diseases that affect the maxillofacial region. The recognition and governance of TMD endure a problem due to the complexity of the aetiology, and there is still a lack of consensus in many areas. While an experimental inspection is the furthermost vital step in detecting TMD, tomography techniques can be useful in some cases. Contingent on the kind of TMD, a variety of therapeutic methods are anticipated, extending from conventional techniques to undeveloped invasive trials. CLP are the utmost mutual consecutive inherited loopholes affecting the orofacial area in TMD. It can happen on its own, in various combinations, or in combination with supplementary inbred distortions such inbred heart disease. Patients with craniofacial cleft distortion must be preserved at the proper time and the suitable age to ensure efficient and cosmetic well-being. As the craniofacial structure is altered in morphology and Growth and Development of the mandibular relation with the cranial base is affected. Which is opt in leading a TMD. With this hypothesis the following article aims to review the association of temporomandibular disorder and to assess disorders in cases with cleft lip and palate.

Key words: Temporomandibular disorder, Cleft lip and palate, Temporomandibular joint, Craniofacial abnormalities

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INTRODUCTION

One of the most serious common congenital abnormalities that affect the jaw and its surrounding tissues. The palate serves as the roof, while the constructions at the mouth's floor serve as the flooring. It is bordered laterally by the cheekbones. A cleft is a genetically anomalous void or split in the top lip, alveolar bone, or pallet [1]. CLP also termed as oral clefts or craniofacial clefts are common congenital abnormalities (birth defects). Birth defects are medical abnormalities that affect the shape or function of one or more bodily components that are present at birth. CLP are induced by an inadequate fusion of upper lip and palate as during early stages of pregnancy. A kid can have a CLP or both because the lips and palate emerge during various periods throughout pregnancy. These birth problems make it difficult for children to eat and communicate. Ear infections, hearing loss, and dental problems are also common among them. CLP are a type of congenital defect that occurs early in the pregnancy. With 1 in 500 or more incidences, the Asian community has the highest prevalence. Men were also more probably to have a cleft lip with or without a cleft palate than females. Cleft palates in women are more common than in men, while men have much more acute malformations. A cleft lip is an incision in the top lip caused by insufficient upper lip development prior to birth. It could be unilateral or bilateral in nature (on both sides of lip). A cleft palate is a defect in the union of the soft and hard palates (roof of the mouth). It could be unilateral or bilateral in nature [2-4].

Despite extensive clinical study, One of the most major source of non-dental discomfort in the craniofacial area, (TMJ) Temporomandibular Disorders, has yet to be identified and treated (TMD). This is because TMD is a vague term that comprises a variety of illnesses having diverse etiologist and manifestation that vary in strength. Surprisingly, some signals and manifestation go away on their own without treatment, while others persist for years after all other hope is lost. Even more perplexing, while certain cases of TMD may have a physical basis,

many cases of TMD also has a major psycho social component [5-7] with several concomitant psychotic disorders such as despair and stress [8-10]. Several treatment approaches have been proposed over the years, some of which have become obsolete while others have gained popularity. Temporomandibular Disorder (TMD) is a term used to refer a problem that involves masticatory muscles, Temporomandibular Joints (TMJ), and other tissues and is characterised by a complex of clinical signs and symptoms. The most prevalent TMD signs and symptoms include recurrent discomfort, neck muscle spasm, limited jaw movement, and temporomandibular joint disturbances. The number of patients describes pain in the masticatory muscles and/or pre-auricular region, which can be readily worsened by biting or other jaw movements [11]. TMJ disorders are caused by a variety of factors, including bad routine, closure misalignment, strain, apprehension, wound and micro trauma, mandibular instability, postural inability, and depression like circumstances [12]. People who are born with craniofacial abnormalities that impair their facial appearance are thought to be more sensitive to psychiatric problems later in life. In a cleft, the mandible is the second most impacted component of the craniofacial apparatus. Because, proximity of the mandible of the cranial base act on both fine and erect face conflict, the posture of the glenoid fossa is believed to have a significant effect in the development of various craniofacial patterns. There have been few studies on occurrence and correlation of TMD among CLP patients. In 6-10 years old children with CLP, a high prevalence of TMD has been reported. Only a few patients with TMD were found in a re-evaluation of 21 years old patients with repaired CLP. Patients with CLPs are potentially at risk of developing Temporomandibular Disorders (TMD), due to malocclusions predisposing them. Hence, class III is a malocclusion and skeletal malocclusion always altered the craniofacial structures. And if craniofacial structure is altered, then relation of the condyle with glenoid fossa will also be altered, and where the glenoid fossa is altered, it is TMD. And as cleft is a skeletal class III it is expected or thought that cleft is associated with TMD [12].

LITERATURE REVIEW

Epidemiology of TMD and CLP

Orofacial clefting develops in around 1.5 out of every 1000 live births (about 220,000 new occurrences each year), with substantial diversity between topographical extents, racial groups, and the type of the cleft [13]. As per the data, India has 72,637 cases of unrepaired CLP. In Goa, the percentage of people with unrepaired CLP who were elder than the mark age category of 1-2 was 37.0 percent, while in Bihar, it was 65 percent. In addition, new born in poor and middle-income countries suffer severe treatment challenges, resulting in long-term disfigurement, social stigma, speech difficulty, and feeding difficulties, which can lead to malnutrition and mortality. Unrepaired Cleft lip and cleft palate were found at a rate of less than 3.5 per 100,000 people in Kerala and Goa to 10.9 per 100,000 people in Bihar [14]. According to several epidemiological studies, if one parent has a cleft, their child has a 3.2% risk of having a cleft lip and palate and a 6.8% probability of having an isolated cleft palate. The presence of a cleft in one parent and one sibling is linked to a 15.8% probability of a cleft lip or palate in the following kid, and a 14.9% likelihood of a cleft palate in the next child. Parents who have one child who has a CLP have a 4.4% probability of having another child with a CLP and a 2.5% fortuitous of having a teen with a secluded cleft palate [15].

The majority of TMD epidemiologic studies have been cross-sectional the findings have primarily focused on prevalence, whereas incidence rates are rare due to the need for longitudinal studies. Agony and discomfort in TMJs and masticatory muscles, noises in the TMJs, and limiting or other abnormalities of mandibular mobility have all been found in epidemiological studies to be common cryptograms and indicators of TMD. They make a transition in given incidence rates is one of the challenges with interpreting the results of such investigation. Prevalence rates for reported symptoms ranged from 16% to 59%, while clinical indicators ranged from 33% to 86%, according to a study of 18 epidemiologic studies published in the early 1980 s. A more recent meta-analysis of 51 prevalence studies found even greater disparities in prevalence 6% to 93% based on individuals' reports and 0% to 93% based on clinical assessments. 'Among 15,000 respondents, the mean value for alleged dysfunction was 30%; among 16,000 foci, the typical value for clinically evaluated dysfunction was 44%. The current epidemiologic study has supplied us with data indicating that TMD signs and symptoms are frequent in population; nevertheless, it is obvious that only a minor percentage of those with such cryptograms and indications have true problems [16].

The condyle is the mandible's growth centre, and the shape of the mandible is influenced by its growth. The condylar growth, jaw function, and overall morphology of the face are all affected by TMJ trauma and pathology in developing individuals. As a result, early detection and treatment of TMJ disorders helps to avoid future developmental, functional, and aesthetic concerns.

Clinical features: There are two types of clinical signs in people who have a CLP

- Dental issues in CLP.
- Skeletal problems, Esthetical and others.

Dental problems in CLP

- **Crowding of teeth:** As a result of this issue, dental crowding arises, which is a type of malocclusion (or "poor bite"). When teeth don't have enough room to develop into their proper places, they will grow in unnatural postures in order to find a space to grow in competition with other teeth. This can result in crooked, crowded, and misaligned teeth [18].
- **Missing teeth:** 66.7% of individuals had missing teeth, with the maxillary lateral incisor being most

often impacted tooth found in the cases of CLP and TMD [18].

- **Supernumerary:** Patients with additional teeth were found in 16.7% of cases. Supernumerary lateral incisors were greatly more recurrent in individuals with CLP in comparison with other cleft types. Hypertonia, distodens, mesiodens, peridens, Para teeth, and supplemental teeth are examples of supernumerary teeth [18].
- **Bone alignment:** Incomprehensive therapy of individuals with CLP, alveolar bone grafting is a critical step (CLP). Failure to treat the alveolar cleft can result in a number of issues. The dearth of investing bone often makes it impossible to rectify anterior tooth abnormalities, limiting orthodontic treatment and/or prosthodontic rehabilitation.
- **Improper occlusion:** Crowding of teeth and missing tooth in the oral cavity leads to improper occlusion.
- **Natal and neonatal teeth:** The existence of neonatal teeth in clefts doesn't seem to have an impact on the main/ secondary dentition. Mostly natal teeth in cleft new born are placed on the lateral boundary of premaxillary and maxillary segments [17,18].
- **Microdontia:** The presence of little teeth distinguishes CLP. (microdonts). This occurs more frequently in patients who lack lateral incisors. Peg-shaped upper lateral incisors are common [17].
- **Taurodontism:** Taurodontism has been connected to a variety of dental developmental disorders and abnormalities [18].
- **Ectopic eruption:** Clefts can also produce ectopic outburst of primary lateral incisors, which can erupt palatally adjacent to/ in cleft, as well as palatally erupting permanent canines on the side of alveolar clefts. The eruption of permanent incisors may take longer than predicted [18,19].
- **Enamel hypoplasia:** Enamel hypoplasia is more common in CLP individuals than in non-cleft patients, especially in the maxillary central incisors [18].

Skeletal problems, esthetic and others

- **Attrision:** Due to crowding of teeth's Increased friction and enamel erosion as a result of tooth-to-tooth contact.
- **Esthetics:** In the practise of modern dentistry, aesthetics has become increasingly essential. The patient's desire for aesthetics drives them to seek dental care, which is often influenced by cultural, ethnic, and personal references.
- **Maxillary constriction:** Due to occlusion instability leads to TMD.
- **Skeletal class III:** Combinations of skeletal and dent alveolar components are common in people with class III malocclusion. Which leads to TMD?
- Speech difficulties: Dysfunction of the m. levator veli palatini affects muscle vocalization. The most common discovery is consonant sound retardation (g, b, k, d, t, p). Cleft lip and palate patients typically have incorrect nasal resonance and difficulty articulating [20].
- Ear infection: The m. tensor veli palatini muscle responsible for opening the Eustachian tube malfunctions in some people, resulting in otitis media. Hearing loss can develop in situations when infections occur often. The incidence of a sub mucous cleft palate, on the other hand, skyrockets [20].

Diagnosis

Contributing to the limited data on the effects of clefts on the mandible. A few studies have evaluated and analysing glenoid fossa shape and depth in unilateral CLP cases were conducted, and the results revealed that there was a correlation. This leads to increased depth and width of the glenoid fossa, as well as a reduction in joint space. This may have an impact on the articular disk's position [21]. When the inclination of the condyle in the glenoid fossa was analysed in later investigations, it was discovered that the altered inclination of the condyle causes a change in the position of the articular disc, which possibly can contribute to the aetiology of TMDs in CLP cases [22]. The studies' limitations were that they only looked at the condyle and glenoid fossa, not the disc position. There are a variety of approaches for evaluating TMJ dysfunction, such as tomography and MRI, but Helkimo is a pioneer in generating indices that may be used to clinically assess severity. For analysing the scenario of TMDs this is what we do [23].

Helkimo index

Helkimo index measure the severity and pain of TMJ disorders and consist of three types: Anamesis, clinical, occlusal dysfunction. This index is excellent means to allow check disease severity, measure effectiveness of TMD but the only limitation is in anamesis type analysis there mild and severe analysis but moderate option and for overcoming this limitation Craniomandibular index is introduced [21]. Craniomandibular index is introduced by Friction and Schiff man to measure unbiased brutality of mandibular movements, shared noise and muscle and joint tenderness using visibly demarcated norms, simple experimental systems and ease in grading. In cases when there is no craniofacial defect, the dental apparatus and interdental relationship show essential part in the

manifestation of TMD. Factor TMD3 is also thought to be caused by a interact dental malocclusion. Meanwhile, orthopaedic, orthodontic, and orthognathic surgery are being used to treat CLP cases. The bite blocks utilised with the expansion devices operate as TMJ deprogramming, which can be expected to correct TMD in the early stages, but this is not always the case, and these instances may reveal TMD later in life to assess the presence of TMDs in the cleft [24-27].

The patient's digital records will be taken and saved (lateral cephalogram, photos, and models). All patients with CLP will have their Helkimo, MFIQ, CMI,

and Fonseca indices documented. The Helkimo index will be used to assess the existence and severity of TMD in cleft cases, while the MFIQ index will be used to measure mandibular functionality in cleft cases.

Treatment

There are two types/ways of treatment

- Surgical: Surgically we will do condylectomy.
- Non-surgical: we use various types of splints non-surgically.

DISCUSSION AND CONCLUSION

CLP is always associated with skeletal malocclusion and in CLP we mostly see skeletal class 3 cases which lead to the craniofacial abnormalities and this arrangement of TMJ. Where there is an altered morphology of TMJ, it is always associated with TMD and hence we conclude that there is high prevalence of CLP associated with TMD. We therefore recommend that appropriate treatment at prescribed time.

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