



Investigating The Existing Clinical Gap In Integrated Clinical Therapy Of Specific And Non-Specific Craniofacial Structural And Functional Defects For Referral To Orthodontists By ENT surgeons and speech therapists.

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ABSTRACT:

Introduction

Overly small airways can be a predisposing factor for blockage of the upper respiratory tracts, along with hypertrophy adenoids and tonsils, chronic and allergic rhinitis, environmental irritants, infections, congenital nasal abnormalities, nasal trauma, polyps, and tumours. Regarding this, the literature mentions the significance of jaw abnormalities and malpositions, alterations in the morphology of the airways, and respiratory issues.

Material and Methods

A descriptive cross-sectional study included total 50 respondents (25 each speciality) **Otolaryngologists (ENT Surgeons) and speech therapists** , working in government and private sector, random sampling method used

Result

Out of 25 ENT Surgeons, only 36% (09) sent patients to orthodontists; of those, only 12% (03) send patients always, 24% (06) send patients sometimes, and 64% (16) never send patients. similarly out of 25 speech therapists, only 44% (11) sent patients to orthodontists, of those, only 24% (06) send patients always, 20% (05) send patients sometimes, and 56% (14) never send patients.

Conclusion

The main problem that has come to light in this study is that the time-consuming and challenging nature of orthodontic problem identification for speech therapists and ENT surgeons. In summary, the collaboration between ENT surgeons, speech therapists, and orthodontists is often seen in the context of addressing complex issues related to speech, swallowing, and airway function. A team approach allows for a more holistic and effective treatment of patients with conditions affecting the head and neck region.



Introduction

Overly small airways can be a predisposing factor for blockage of the upper respiratory tracts, along with hypertrophy adenoids and tonsils, chronic and allergic rhinitis, environmental irritants, infections, congenital nasal abnormalities, nasal trauma, polyps, and tumours. Regarding this, the literature mentions the significance of jaw abnormalities and malpositions, alterations in the morphology of the airways, and respiratory issues.^{1,2}

Josep et al.³ proposed that anteroposterior airway dimensions may be constrained due to skeletal features, such as a retrognathic maxilla.

The generally accepted consensus is that dentofacial development is influenced by nasorespiratory function. Specifically, it has been hypothesised that persistent blockage of the nasal airway causes mouth breathing, which in turn affects the posture of the mandible and the tongue. If this occurs during growth it results in the development of what has been called “adenoid facies.”⁴

Baik UB⁵ et al in 2002 came to the conclusion that maxillary expansion is vital for treating severe nasopharyngeal cavity constrictions as well as for correcting maxillary narrowing. The enhanced nasal flow that resulted from maxillary expansion in individuals with obstructive sleep apnea syndrome (OSAS) therefore decreased subatmospheric inspiratory pressure, which in turn minimized pharyngeal collapse.

The pharyngeal size and shape variations between pre- and post-trials of mandible-protruding oral appliance therapy were assessed by Kyung et al.⁶ They discovered that the pharynx had become significantly enlarged as a result of the oral appliance therapy. Hence referring to a mechanism for the mandibular prognathism efficacy with oral appliances.

Nearly 90% of all consonants are made in the anterior portion of the oral cavity, suggesting that the dental arch relationship may be one of the most important factors affecting articulation.⁷ A deviation in dental structure or

alignment may interfere with the normal process of air flow and pressure, as well as proper lip and tongue placement and contouring, thereby affecting the integrity of speech sound production.^{8,9}

Material and Methods

Study design, setting, and study population

A descriptive cross-sectional study was undertaken to investigate the acceptance and attitudes of healthcare professionals, including consultants and resident doctors.

Sample size and sampling procedure

This study included total 50 respondents (25 each speciality) **ENT surgeons and speech therapists** , working in government and private sector, random sampling method used.

Data collection procedures

Data were collected through an online survey using a pre-designed, pre-validated questionnaire hosted on Google Forms. The survey link was widely disseminated via various social media platforms, including, WhatsApp, and email. The investigators shared the survey link through individual messages in WhatsApp, WhatsApp groups, and email IDs. Participant confidentiality was rigorously maintained throughout the study.

Statistical analysis

Data were initially exported from Google Sheets to an Excel spreadsheet. Statistical analysis was done using MS Excel spreadsheets. Analysis was done in the form of percentages, proportions and represented as tables and figures wherever necessary. Appropriate tests of significance were applied. Final data was analyzed quantitatively in terms of frequency/number and percentages. Mean and standard deviation were calculated for continuous data. Categorical data was analyzed using percentage and chi-square test and multiple regression analysis. A p-value of <0.01 was considered significant.



Results

Table no. 1- Univariable and multivariable logistic regression (ENT Surgeons) for the effect of, Area of work, years of experience and qualifications on orthodontic referrals (n = 25)

Category		Frequency	Percentage	Univariate p-value	Multivariate p-value
Area of work	Government hospital	7	28	.2466	0.0002
	Medical college	12	48		
	Private	6	24		
Qualification	PG student	8	32	0.071	
	Consultant / Private practitioner	17	68		
Clinical Experience	less than 5 years	11	44	0.326	
	5-10 year	9	36		
	more than 10 years	5	20		

The p-values for the multivariate analyses suggest that there is a significant relationship between the area of work, qualification, and clinical experience of the healthcare professionals.

Table no.2- Univariable and multivariable logistic regression (Speech Therapists) for the effect of area of work, years of experience and qualifications on orthodontic referrals (n = 25)

Category		Frequency	Percentage	Univariable p-value	multivariable p-value
Area of work	Government hospital	2	08	<0.001	0.658
	Medical college	2	08		
	Private	20	80		
	Trust Hospital	1	04		
Qualification	PG student	1	4	<0.001	
	UG students	4	16		
	Consultant / Private practitioner	20	80		
Clinical Experience	less than 5 years	8	32	0.176	
	5-10 year	13	52		
	more than 10 years	4	16		



We examined the Speech Therapist's referral patterns to orthodontists in relation to the characteristics such as area of work, qualification and clinical experience. In the univariable logistic regression, there was a statistically significant result for the effect of the area of work and

qualification but not withstanding clinical experience and in the multivariable regression model for the effect of area of work, qualification and clinical experience in the decision for orthodontic referral, we could not identify any significant predictors overall.

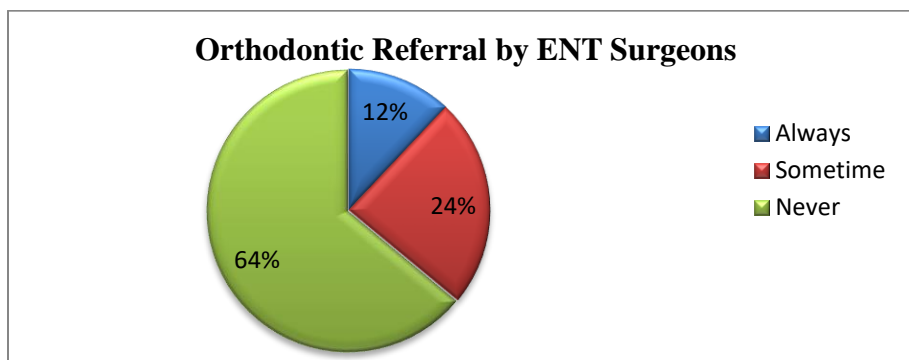
Sr. No.	Questions	Always	Sometime	Never
1.	Do you agree that orthodontic treatment or orthodontic functional appliance therapy gives good result in obstructive sleep apnea treatment?	44%(11)	52%(13)	04%(01)
2.	Do you agree that aligning the teeth, helps in mastication, better oral hygiene, improved speech and healthy lifestyle?	92%(23)	08%(23)	0
3.	Do you agree that temporomandibular joint disorders can be cured by orthodontic therapy?	04%(01)	72%(18)	24%(06)
4.	Do you agree that the Maxillary expansion, Mandibular repositioning devices (MRDS), Bilateral sagittal split osteotomy procedure are helpful in adenoid treatment?	12%(03)	80%(20)	08%(02)
5.	Do you agree ENT surgeon have a role in identifying and preventing malocclusion?	12%(03)	60%(15)	28%(07)
6.	Do you have orthodontist in your cleft repair team?	12%(03)	36%(09)	52%(13)
7.	Do You agree that Identification of Malocclusion Difficult /Time Consuming in Practice?	32%(08)	56%(14)	12%(03)
8.	Do you agree every otolaryngologist should look into occlusion during routine examination of tonsils and pharynx?	72%(18)	24%(06)	04%(01)
9.	Do you generally refer a patient with malocclusion to an orthodontist for treatment? (if yes)	12%(03)	24%(06)	64%(16)
9A	If yes how many patients do you referred with malocclusion to an orthodontist in a month? Only 9 response receive	1-5 patients	5-10 patients	<10 patients
		77.8%(07)	22.8%(02)	0
10.	Do you agree paediatricians / otolaryngologist/ General physician/ orthopaedic surgeons/speech therapist should collaborate with orthodontists with regard to 10. Do you agree paediatricians / otolaryngologist/ General physician/ orthopaedic surgeons/speech therapist should collaborate with orthodontists with regard to malocclusion?	92%(23)	08%(25)	0

Table no.3 Responses of ENT Surgeons in relation to orthodontic examination and treatment modalities

If respondents answered "yes" to the question (question no 9), they were asked question 9A patients referred with malocclusion to an orthodontist in a month.



Figure no.1 -Pictographic representation of Orthodontic Referral by ENT Surgeons



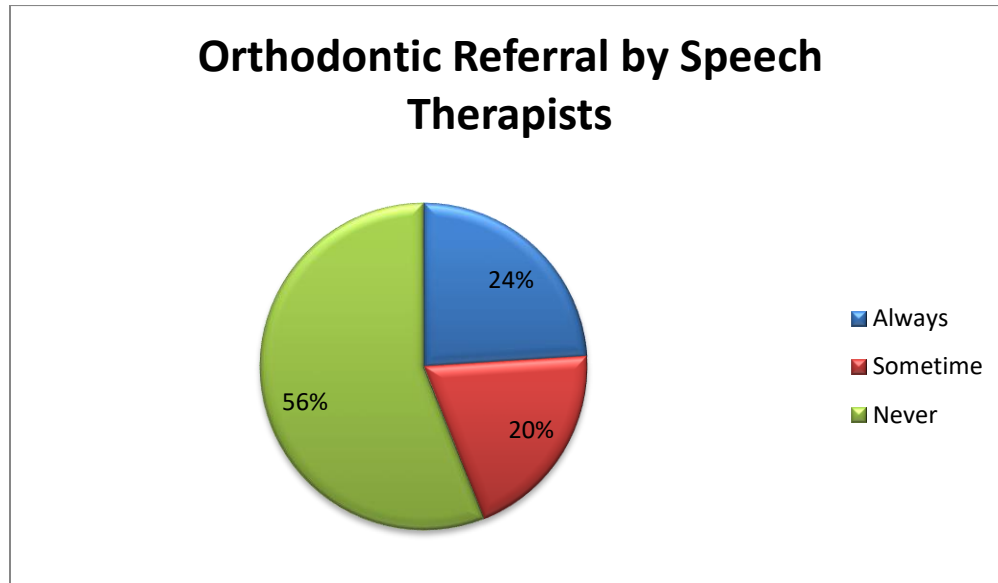
Out of 25 participants (Question No. 9 and 9A), only 36% (09) sent patients to orthodontists; of those, only 12% (03) send patients always, 24% (06) send patients sometimes, and 64% (16) never send patients. Of these, 77.8%(07) sends 1-5 patients , and 22.8%(02) sends 5–10 patients to orthodontists each month for malocclusion management.

Table 4: Responses of Speech Therapist in relation to orthodontic examination and treatment modalities

Sr. No.	Questions	Always	Sometime	Never
1.	Are you agree that conjunction of lips, tongue and teeth play important role in articulation of consonant.	92%(23)	08%(23)	0
2.	Do you agree that mal functional habit (tongue thrusting, thumb sucking) lead to malocclusion and speech defects.	44%(11)	52%(13)	04%(01)
3.	Do you consult a child whose behaviour/ personality has changed as a result of malocclusion, because malocclusion manifests as speech difficulties?	28%(07)	68%(17)	04%(01)
4.	Do you believe that speech pathology is treated without correction of malocclusion. (like Production of the /s/ and /t/ sounds is most affected by an open-bite malocclusion).	36%(09)	44%(11)	20%(05)
5.	Do you agree that frontal segment of the dental arches have an important role in sibilants pronunciation and sibilant speech disorder	36%(09)	48%(12)	16%(04)
6.	Do you agree that aligning the teeth, helps in mastication, better oral hygiene, improved speech and healthy lifestyle?	72%(18)	28%(07)	0
7.	Do you agree Identifying Malocclusion Is Difficult /Time Consuming in Practice.	44%(11)	44%(11)	12%(03)
8.	Do you believe narrow arches are a common clinical finding of patients with speech defects.	48%(12)	32%(08)	20%(05)
9.	Do you generally refer a patient with malocclusion to an orthodontist for treatment? (if yes)	24%(06)	20%(05)	56%(14)
9A	If yes how many patients do you referred with malocclusion to an orthodontist in a month? Only 11 response receive	1-5 patients	5-10 patients	<10 patients
		54.5%(06)	45.5%(05)	0
10.	Do you agree pediatricians / otolaryngologist/ General physician/ orthopedic surgeons/speech therapist should collaborate with orthodontists for prevention of malocclusion?	92%(23)	08%(02)	0



Figure no.2 -Pictographic representation of Orthodontic Referral by Speech Therapists



Out of 25 participants (Question No. 9 and 9A **Table no. 4**), only 44% (11) sent patients to orthodontists, of those, only 24% (06) send patients always, 20% (05) send patients sometimes, and 56% (14) never send patients. Of these, 54.5%(06) sends 1-5 patients, and 45.5%(05) sends 5–10 patients to orthodontists each month for malocclusion management.

Discussion

Functional appliance treatment stimulates mandibular growth by forward posturing of the mandible with the condyles displaced downward and forward in the glenoid fossa.^{10,11} In this study 52% sometime agree and 4% deny that the treatment of OSA give good result with orthodontic functional appliance therapy.

Only 4% ENT surgeons are always agree that that TMJ disorder always cured by orthodontic therapy, while Willis¹² categorization indicates that the splints therapy have been used to treat TMJ disorders, decrease in parafunctional activity and rapid, full anterior guidance formation, both of which are beneficial in the management of MPDS. Oral appliance therapy Eliminating any orthopaedic instability between the occlusal position and the joint is the aim of the stabilisation splint's therapy, since it removes the instability as a potential cause of TMD.^{12,13,14}

Maxillary expansion¹⁵, Mandibular repositioning devices (MRDS)¹⁶, Bilateral sagittal split osteotomy¹⁷ all are useful in treating adenoids and preventing upper airway congestion, however in this study, only 12% of specialists consistently agree that these appliances are effective.

In current study only 12% rhinologist are agree that they are have an active role in preventing malocclusion While multiple studies have shown that ENT experts have a significant role in preventing orthodontic problem.¹⁸

Clinicians generally agree that because cleft lip/palate frequently coexists and manifests as dentofacial abnormalities, managing the condition necessitates the involvement of several experts¹⁹, including orthodontists.²⁰ The patients' dental abnormalities included impacted teeth, rotated teeth, edge-to-edge occlusion, ectopic eruption, anterior cross-bite, anterior open-bite, misplaced teeth, hypoplastic maxilla, and upper midline shift.²¹ In current study only 12% ENT surgeon are agree that they have orthodontist in your cleft repair team

32% ENT surgeon always, 56% sometime agree that identifying malocclusion is difficult /time Consuming in Practice. Sanchez OM²² et al concluded that medical trainee received 2 h or less of preventive dental education during medical and specialty training. This could also be a reason that they find difficult in identifying malocclusion. 12% always agree 60% sometime agree ENT surgeon have a role



in identifying and preventing malocclusion. 72% also believe that they should look into occlusion during routine examination of tonsils and pharynx.

Studies on the topic have been conducted because of the long-held assumption that there is a mutually beneficial contact between the pharynx and the dentofacial structures.^{23,24} In spite of this only 12% ENT surgeon always sending patients, 64% never sending patients to orthodontist

The correlation between speech therapy and orthodontics lies in their combined focus on oral function and structure. Orthodontics primarily deals with the alignment of teeth and jaws, while speech therapy addresses issues related to communication, articulation, and oral muscle coordination. Specialists in the field of speech therapy and orthodontics evaluate developmental and functional processes of the stomatognathic system.²⁵

Research has explored the potential correlation between certain speech sound disorders and malocclusion. Shriberg²⁶ et al. 2010 discusses the complexity of speech sound disorders and mentions potential links with orofacial structures.

92% speech therapist are agree that conjunction of lips, tongue and teeth play important role in articulation of consonant.

Speech sound production problems are linked with aspects of malocclusion.²⁷ In this study 36% speech therapist agree that they treat sound production error without treating malocclusion. It is impossible to treat a disease without treating its etiology. While 72% speech therapist agree that aligning the teeth, helps in mastication, better oral hygiene, improved speech and healthy lifestyle.

However, speech difficulties associated with malocclusion may contribute to frustration, communication challenges, or social concerns that could indirectly affect a child's behavior or personality. A study Montiel-Company²⁸ et al. 2014 discusses the psychosocial impact of malocclusion, including potential effects on self-esteem and quality of life. In current study only 28% always attend and 68% sometime consult a child whose personality affected.

A child may exhibit behavioral changes as a response to communication challenges. Research exploring the psychosocial aspects of speech disorders can provide insights; for instance, the study by Lousada²⁹, et al. 2019 concise Orthodontic treatment aimed at addressing malocclusion has been associated with positive psychosocial outcomes. Another Randomized Controlled Trial" by

Zhang³⁰, et al. (2016), highlights the potential psychosocial benefits of orthodontic treatment.

The main problem that has come to light in this study is that the time-consuming and challenging nature of orthodontic problem identification for speech therapists and ENT surgeons.

In summary, the collaboration between ENT surgeons, speech therapists, and orthodontists is often seen in the context of addressing complex issues related to speech, swallowing, and airway function. A team approach allows for a more holistic and effective treatment of patients with conditions affecting the head and neck region.

Conclusion

To foster collaboration between ENT specialists, speech therapists, and orthodontists, several initiatives and practices can be implemented. Here are some suggestions:

Establish a communication channel- Create effective communication channels between the different specialties. This could involve regular meetings, case discussions, and shared electronic platforms for exchanging patient information securely.

Interdisciplinary training- Arrange interdisciplinary training sessions or workshops where professionals from each specialty can share their expertise, insights, and experiences. This can enhance mutual understanding and create a more cohesive approach to patient care

Development of treatment protocol- Collaborate to develop standardized treatment protocols for common conditions that involve all three specialties. This can streamline the decision-making process and ensure consistent care practices.

Joint case conference - Hold regular joint case conferences where specific patient cases are discussed collaboratively. This allows each specialist to contribute their unique perspective, leading to a more comprehensive understanding of the patient's needs

Shared electronic health care records- Implement a shared electronic health record (EHR) system that allows authorized professionals from different specialties to access relevant patient information. This facilitates better coordination and continuity of care.

Multidisciplinary clinics- Consider establishing multidisciplinary clinics where patients can receive integrated care from ENT specialists, speech therapists, and orthodontists in a single visit. This can enhance convenience



for patients and promote collaboration among professionals.

Educational Initiatives - Develop educational materials and resources that highlight the importance of collaboration between these specialties. This can include informational brochures for patients and continuing education programs for healthcare professionals.

Regular interpersonal meetings-Schedule regular meetings where professionals from different specialties can discuss ongoing cases, share updates on research and advancements, and identify areas for improved collaboration.

Research collaborations-Encourage collaborative research projects that explore the intersections between ENT, speech therapy, and orthodontics. This not only contributes to the scientific knowledge base but also strengthens professional ties.

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