Journal of Pharmaceutical Research International

33(60B): 3815-3820, 2021; Article no.JPRI.80062
ISSN: 2456-9119
(Past name: British Journal of Pharmaceutical Research, Past ISSN: 2231-2919, NLM ID: 101631759)

Comparative Evaluation of Preventive and Interceptive Orthodontic Treatment Need in Children of 6-9 Years and 9.1- 12 Years

Sumukh Nerurkar [a*≡], Ranjit Kamble [bϖ], Sunita Shrivastav [b#] and Jeni Ann Mathew [a≡]

[a] M.D.S Orthodontics and Dentofacial Orthopaedics, Sharad Pawar Dental College, Datta Meghe Institute of Medical Sciences, Wardha, India.
[b] Department of Orthodontics and Dentofacial Orthopaedics, Sharad Pawar Dental College, Datta Meghe Institute of Medical Sciences, Wardha, India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i60B35081

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/80062

Study Protocol

Received 20 November 2021
Accepted 26 December 2021
Published 28 December 2021

ABSTRACT

Introduction: Preventive and interceptive orthodontics, emphasizes on reduction of later need for complex orthodontic treatment. This thus increases the comprehensiveness of healthcare and help in strengthening the primary care. In literature, there is no comparison between the preventive and interceptive treatment needs in patients belonging to growing age (6-9 years) and those belonging to non-growing age (9.1-12 years). There is a need to compare these finding according to the age group.

The present study aims to utilize the IPION to quantify the proportion of central Indian children who would gain from the preventive and interceptive orthodontics.

Materials and Methods: The study will be conducted in the Department of Orthodontics, SPDC, Wardha in collaboration with Department of Public Health Dentistry, SPDC, Wardha. Total 383

[≡] *Post- Graduate;*
[ϖ] *Professor & HOD;*
[#] *Professor & Dean Examination;*
**Corresponding author: E-mail: sumukh170297@gmail.com;*

patient in age group of 6 to 12 years, will be selected. All the features of the IPION-6 and IPION-9 will be recorded, and the variables will be multiplied by weighting factors according to the instructions of the original study by Coetzee. All the features of IPION-12 will be recorded, and the variables will be multiplied by weighting factors.
Expected Results: There will be a decrease in the need of orthodontic treatment in patients who have completed the age of 9 years.

Keywords: Preventive orthodontics; interceptive orthodontics; IPION; orthodontic treatment.

1. INTRODUCTION

Preventive and interceptive orthodontics refers to, emphasizing on reduction of later need for complex orthodontic treatment [1]. This would thus increase the comprehensiveness of healthcare and help in strengthening the primary care.

Proper diagnosis and treatment planning during the mixed dentition phase can produce the most satisfying results and consequently have longer-term stability than late therapy. These techniques reduce the need for orthodontic treatment in the future [2].

There are a significant number of orthodontic indices that are already present. Some of these indices determine need of orthodontic treatment, whereas other indices assess the quality of treatment. There is only one index that indicates the need for orthodontic treatment, both preventive and corrective. Coetzee's index for preventive and interceptive orthodontic need (IPION) is the only one that has been published [3].

The IPION only records the interceptive and preventive treatment need from 6-9 years. But there is no index to evaluate it during the pre-pubertal age, which is an important age group for preventive and interceptive orthodontics. Thus, it deems necessary to evaluate it during the age group of 9-12 years [4].

Because the IPION is the only orthodontic index that measures preventive and interceptive orthodontic treatment needs, and because there are currently no published studies utilising this index for the Central Indian population, research that focuses on measuring early orthodontic treatment needs in this population is critical. Such data would be helpful in bringing attention to this serious health issue [5]. The IPION will be used in this study to determine the percentage of Central Indian schoolchildren who would benefit from preventative and interceptive orthodontic therapy.

1.1 Aim

To evaluate and compare the preventive and interceptive orthodontic treatment need in the school going children between age 6-9 years and 9.1-12 years in central India population.

1.2 Objectives

1. To evaluate the preventive and interceptive orthodontic treatment needs in school going children between age of 6-9 years and 9.1-12 years in central India population.
2. To compare the preventive and interceptive orthodontic treatment needs in school going children boys and girls between age of 6-9 years and 9.1-12 years in central India population.

2. MATERIAL AND METHODS

2.1 Study Design

The observational study will be conducted in the department of Orthodontics and Dentofacial Orthopaedics, Sharad Pawar Dental College, Sawangi (M), Wardha in collaboration with The department of Public Health Dentistry, DMIMS (DU), Wardha.

Total 383 patient in age group of 6 to 12 years, will be selected from the patients coming to Out Patient Department (OPD) of Orthodontics and Dentofacial Orthopaedics and screening camps that would be conducted in primary schools in and around Wardha.

2.2 Inclusion Criteria

- Patient with age group 6-12 years

2.3 Exclusion Criteria

- Patient with previous orthodontic treatment.

- Patient with ongoing orthodontic treatment.
- Patient with systemic disease.
- Patient having a history of any trauma or surgery

2.4 Sample Size Calculation

Mean values are taken from article "Preventive and interceptive orthodontic needs among Syrian children by Ahmad S. Burhan et al":

The sample size was calculated by the for
$n = N*X / (X + N - 1)$,

where,

$X = Z\alpha/2^2\ p(1-p) / MOE^2$,

And Zα/2 is the critical value of the normal distribution at α/2 (e.g. for a confidence level of 95%, α is 0.05 and the critical value is 1.96)

MOE is the margin of error, p=50% is the sample proportion,

And N is the population size.

Margin of error= 5%
Confidence level = 95%
Population = 100000
Sample proportion= 50%

Total sample size is 383

There are total 3 groups. That is 128 per group.

2.5 Methods

All children to be examined will be selected from the patients coming to Out Patient Department (OPD) of Orthodontics and Dentofacial Orthopaedics and screening camps that would be conducted in primary schools in and around Wardha.

Table 1. The five components and the weighting factors of ipion-12

Components Of IPION-12	Description of variable		Weighing factor
Primary component interproximal caries	i.	Caries in maxillary and mandibular permanent incisors	1
	ii.	Caries in the maxillary and mandibular permanent canines	1
	iii.	Caries in the maxillary and mandibular permanent first premolars	2
	iv.	Caries in the maxillary and mandibular permanent first molars	4
	v.	Caries in the maxillary and mandibular deciduous second molars	4
Over retained primary teeth	i.	Over retained maxillary and mandibular deciduous canines	1
	ii.	Over retained maxillary and mandibular deciduous first molars	2
Anterior component	i.	Supernumerary teeth	4
	ii.	Ugly duckling stage	4
Posterior component	i.	Rotation of maxillary first permanent molars	4
	ii.	Tipping of maxillary first permanent molars	4
	iii.	Rotation of maxillary first permanent premolars	3
	iv.	Tipping of maxillary first permanent premolars	3
Occlusion	i.	Overjet	2
	ii.	Anterior cross-bite	10
	iii.	Overbite	1
	iv.	Anterior open-bite	4
	v.	Posterior cross-bite without functional lateral shift of the mandible during closing	1
	vi.	Posterior cross-bite with functional lateral shift of the mandible during closing	10
Soft- tissue assessment	i.	Lip competency	1

The data will be recorded while they were sitting in a chair using portable light (torch). Instruments include rulers,Vernier calipers, mouth mirrors and probes. All the features of the IPION-6, IPION-9 and IPION-12 will be recorded, and the variables will be multiplied by weighting factors according to the instructions of the original study by Coetzee. Universal precautions and infection-control procedures will be taken [6].

The IPION-9 will be used for any child whose permanent maxillary central incisors are visible upon examination.

The IPION-12 will be used for any child whose permanent maxillary second premolars are visible upon examination**.**

On the basis of Coetzee's study, the overall scores will be divided into three categories of treatment need:

- The scores of 0–5 will be considered 'no treatment need;
- The scores of 6–14 will be considered 'moderate treatment need;
- The scores of 15 or higher will be considered 'definite treatment need.

The raw data will be recorded manually by two trained researchers using scoring sheets specially designed for the present study. All measurements will be done using Vernier Callipers and rulers.

All the features of the IPION-6 and IPION-9 will be recorded, and the variables will be multiplied by weighting factors according to the instructions of the original study by Coetzee [7].

All the features of IPION-12 will be recorded, and the variables will be multiplied by weighting factors [8].

2.6 Statistical Analysis

The χ^2 test will be used to detect statistical difference between the indices and the sex groups. A P value of 0.05 or less is considered to be statistically significant.

2.7 Scope

It will help us to evaluate the interceptive and preventive treatment needs of children of age 6-12 years in Central India.

3. EXPECTED RESULTS

Due to commencement of growth in the patients of age 9 years, it may be observed that, there will be decrease in the need of orthodontic treatment in patients who have completed the age of 9 years [9].

4. DISCUSSION

This study will help us compare the interceptive and preventive treatment need in patients of growing age and patients of non-growing age. Few studies on interceptive orthodontics were reviewed [10-13].

Karaiskos N et. al. (2005) conducted a study for assessing the potential for early recognition of developing malocclusions A custom-made index (IPION) was developed to calculate the need for such treatment in school children aged 6 and 9 years.

Two calibrated examiners examined each child independently and assessed several components of his or her occlusion. A high prevalence of caries in the deciduous and early loss of primary teeth was observed. A large number of children suffered from crossbite or open bite. Future orthodontic problems were found in 28% of this population.

Onyeaso CO (2004) conducted a study for assessing the needs for preventive/interceptive orthodontics in children of age 7-10 years in Ibadan with a sample size of 493 school children. They were all examined in their school. The study showed that about 27% of the children had needed one form of preventive/interceptive orthodontic treatment or the other.

Onyeaso CO et. al. (2003)The study was done to calculate the nature of orthodontic demands in the unit that could benefit from preventive and interceptive treatment so as to enhance treatment planning, teaching and further research Ninety-three (76.9%) of these children had retained deciduous anterior teeth while 9.1% had proclination of maxillary anterior teeth with moderate spacing. Based on dental history and clinical examination, nine (7.4%) children were involved with oral habits, seven (5.8%) and one (0.8%) had anterior crossbite and supernumerary teeth, respectively. The remaining 39.5% needed full-blown orthodontic treatments.

5. CONCLUSION

We expect there to be a decrease in the interceptive and preventive orthodontic treatment needs due to natural compensation of the body to reduce the malocclusion.

CONSENT

As per international standard or university standard, patient's written consent will be collected and preserved by the author(s).

ETHICAL APPROVAL

The Ethical Approval has been obtained by the Institutional Ethics Committee [Ref. No. DMIMS (DU)/IEC/2021-21/9396].

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Lundergan LB. Preventive dentistry and preventive orthodontics through public dental health education. American Journal of Orthodontics. 1955;41(7): 554-64.
2. Thosar NR, Bane SP, Hake N, Gupta S, Baliga S, Rathi N. Knowledge, Attitude and Practice of Mothers for Administration of Medicaments to Their Children and its Correlation with Dental Caries. Int J Cur Res Rev| Vol. 2020;12(18):5.
3. CastañerPeiró A. Interceptive orthodontics: The need for early diagnosis and treatment of posterior crossbites.
4. Burhan AS, Nawaya FR. Preventive and interceptive orthodontic needs among Syrian children. The Journal of the Egyptian Public Health Association. 2016;91(2):90-4.
5. Kadiyev TA, Aigumov MK, Timokhina T, Baranov KD, Krekova MM, Goncharov VV. The Role of Orthodontic Treatment and Prosthetics during the Recovery Period after Surgical Treatment, Journal of Pharmaceutical Research International. 2021;33(45A):156-162.
   DOI: 10.9734/jpri/2021/v33i45A32728.
6. Karaiskos N, Wiltshire WA, Odlum O, Brothwell D, Hassard TH. Preventive and interceptive orthodontic treatment needs of an inner-city group of 6-and 9-year-old Canadian children. Journal of the Canadian Dental Association. 2005; 71(9).
7. Jadhav VV, Vasudevan SD, Kamble R, Tiwari MM, Bhandari N, Shiji S. ViVan Ratio for Maxillomandibular Tooth Material Discrepancy. Journal of Evolution of Medical and Dental Sciences. 2020;9(25):1865-9.
8. Jadhav VV, Vasudevan SD, Kamble R, Tiwari MM. Comparison of Bolton's Ratio for Evaluation of Tooth Size Discrepancy between Maxillary and Mandibular Arches in Vidarbha Population. Journal of Evolution of Medical and Dental Sciences. 2020;9(21):1659-63.
9. Sharma N, Shrivastav S, Kamble R, Sharma P. A Tailored Approach for Growth Modification: An Innovative Approach. World. 2017;8(4): 334-42.
10. Thote, Abhishek M, Krishna Sharma, Rashmi V. Uddanwadiker, and Sunita Shrivastava. Optimum Pure Intrusion of a Mandibular Canine with the Segmented Arch in Lingual Orthodontics. Bio-medical Materials and Engineering. 2017;28(3): 247–56.
    Available:https://doi.org/10.3233/BME-171671.
11. Thote, Abhishek M, Rashmi V. Uddanwadiker, Krishna Sharma, and Sunita Shrivastava. Optimum Force System for Intrusion and Extrusion of Maxillary Central Incisor in Labial and Lingual Orthodontics. Computers in Biology and Medicine. 2016;69: 112–19.
    Available:https://doi.org/10.1016/j.compbiomed.2015.12.014.
12. Gilani, Rizwan, Pavan Bajaj, Nikhil Mankar, Rozina Vishnani, Pallavi Daigavane, and Priyanka Niranjane. Photo Catalytic Silver Modified Orthodontic Brackets - An Innovative Method for Prevention of White Spot Lesions. Journal of Evolution of Medical and Dental Sciences-JEMDS. 2020;9(38):2787–90.
    Available:https://doi.org/10.14260/jemds/2020/607.
13. Yeluri, Ramakrishna, Manjunath Hegde, Sudhindra Baliga, and Autar Krishen

Munshi. Multiple Supernumerary Teeth Associated with an Impacted Maxillary Central Incisor: Surgical and Orthodontic Management. Contemporary Clinical Dentistry. 2012;3(2): 219–22.
Avaialble:https://doi.org/10.4103/0976-237X.96844.

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/80062