INPLASY

EFFICIENCY OF CLEAR ALIGNER VERSUS CONVENTIONAL APPLIANCES IN GROWING PATIENTS -A SYSTEMATIC REVIEW

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ADMINISTRATIVE INFORMATION

Support - No support.

Review Stage at time of this submission - Formal screening of search results against eligibility criteria.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 10 May 2024 and was last updated on 10 May 2024.

INTRODUCTION

*R*eview question / Objective "Are Clear aligners effective in growing children when compared to conventional appliances?"

Rationale Orthodontic treatment in children presents unique challenges. There are certain challenges that individuals may face when it comes to their treatment. One of these challenges is ensuring compliance, as it can greatly affect the effectiveness of the treatment. Additionally, maintaining good oral hygiene and adhering to diet restrictions can prove to be quite difficult for some individuals. The duration of treatment can be quite lengthy, which may lead to feelings of impatience or a decline in motivation over time. Recent advancements in treatment techniques have shown that Clear Aligner Therapy holds great promise as an effective approach for treating children and young adults. There is a scarcity of articles addressing the management of dentition in growing children using clear aligner therapy. We aimed to conduct a thorough literature search and evaluate the existing evidence on the clinical effectiveness of clear aligner therapy compared to conventional appliances in growing patients.

Condition being studied Orthodontic treatment in children presents unique challenges. There are certain challenges that individuals may face when it comes to their treatment. One of these challenges is ensuring compliance, as it can greatly affect the effectiveness of the treatment. Additionally, maintaining good oral hygiene and adhering to diet restrictions can prove to be quite difficult for some individuals. The duration of treatment can be quite lengthy, which may lead to feelings of impatience or a decline in motivation over time. Recent advancements in treatment

techniques have shown that Clear Aligner Therapy holds great promise as an effective approach for treating children and young adults.The realm of orthodontics has been profoundly transformed by the advent of clear aligner technology, offering a blend of aesthetic appeal and comfort for patients undergoing treatment for various malocclusions. However, the application of aligners in growing patients remains relatively unexplored, with studies focused predominantly on adolescents and adults. Correction of a Class II malocclusion was found to be achieved through a combination of an increase in mandibular length and dentoalveolar changes. Invisalign has recently designed a mandibular advancement feature (MA) on their clear aligners to aid in class II correction in growing patients. Even aligners used for expansion, distalisation etc. There is a scarcity of articles addressing the management of dentition in growing children using clear aligner therapy. We aimed to conduct a thorough literature search and evaluate the existing evidence on the clinical effectiveness of clear aligner therapy compared to conventional appliances in growing patients.

METHODS

Search strategy The Cochrane Central register of controlled trials, Google scholar Web of science, PUBMED database were searched from 2011 January till december 2023. Randomized clinical trial (RCT), controlled clinical trials (CCTs), prospective and retrospective studies were considered eligible for inclusion in this review. Articles and abstracts from the search were examined to exclude irrelevant studies. Using the Boolean operators AND/OR the following Boolean formulas were worded: #1 (Clear aligners OR aligners OR invisalign teen)#2 (Fixed appliance) OR (traditional appliance)) OR (twin block)) OR (herbst)) OR (2*4 appliance)) OR (2*6 appliance)#3 (Growing children) OR (adolescents)) OR (teenagers)) OR (Young adults)) OR (early orthodontic treatment. #4 |(Overjet) OR (overbite)) OR (deep bite)) OR (mandibular advancement)) OR (Posterior crossbite)) OR (anterior crossbite). #5 #1 AND #2 AND #3 AND #4.

Participant or population Population here taken were Growing children, adolescents, teenagers, Young adults.

Intervention Clear aligners, Aligners and Invisalign teen, Invisalign first.

Comparator Fixed appliance, traditional appliance, functional appliance, distalising appliances, expansion appliances, twin block, herbst, 2*4 appliance, 2*6 appliance.

Study designs to be included The study encompassed a range of research methodologies, including randomized controlled trials, retrospective studies, and prospective studies. It will also include studies that focus on both clear aligners and conventional treatment, as well as studies conducted specifically in growing children.

Eligibility criteria The inclusion criteria encompassed randomized controlled trials (RCTs), prospective and retrospective studies that examined the use of clear aligners and conventional treatment in growing children. On the other hand, studies that lacked a control group, studies conducted in adult patients, case reports, and case series were excluded as part of the exclusion criteria.

Information sources The electronic databases PUBMED, Scopus, Google Scholar, Web of Science, and Cochrane were searched for articles published between January 2011 and December 2023. Studies were collected from Pubmed, Scopus, google scholar, cochrane, Web of science and grey literature.

Main outcome(s) We will evaluate duration of treatment and dental changes such as changes in incisor irregularity, incisor inclination, molar inclination, overjet and overbite. The arch changes that will be evaluated include include arch width and length, arch depth, arch perimeter, surface area and volume.

Data management Data extraction will be made in PRISMA flowchart, removing duplicates and managing citations and bibliographies. The study selection process will be carried out in two steps independently: initial screening of titles and abstracts of all studies according to predetermined inclusion criteria then full text assessment. Any discrepancies between the review authors would be handled by discussion with a third researcher.

Quality assessment / Risk of bias analysis Grading of Recommendations Assessment, Development and Evaluation (GRADE) will be implemented to assess the overall quality of evidence for the studies included in this systematic review.

Strategy of data synthesis The relevant data presented in the articles featured in this study will be extracted according to a customized data collection form and then results will be compiled,

discussed and revised by the working group. Two separate sheets will be utilised to record the dental and arch changes separately. The dental changes will record all the changes related to incisor irregularity, incisor inclination, molar inclination, overjet and overbite. The arch changes that will be evaluated include include arch width and length, arch depth, arch perimeter, surface area and volume.

Subgroup analysis The intervention group will be divided into subgroups based on dental changes and arch change characteristics. The estimated effect and heterogeneity of each subgroup will be evaluated on how people respond to different subgroups.

Sensitivity analysis After the subgroup analysis, any article with high heterogeneity will be excluded and then subjected to forest plot analysis.

Language restriction Articles in English would be considered for this review.

Country(ies) involved India.

Keywords Clear aligner; Fixed appliance; Adolescent; Malocclusion; Interceptive orthodontics; Slow maxillary expansion; Molar inclination; Teenagers; Class 2 malocclusion.

Dissemination plans Once the review is done, we are planning to publish the achieved results.

Contributions of each author
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