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*Supplementary*

# Comparison of Pain Perception between Clear Aligners and Fixed Appliances: A Systematic Review and Meta-analysis

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Legends

**Table S1**. PRISMA 2009 Checklist.

**Table S2**. List of potentially relevant studies not included in the systematic review, along with the reasons for exclusion.

Table 1. PRISMA 2009 Checklist.

| | | | |
|---|---|---|---|
| | | **TITLE** | |
| Title | 1 | Identify the report as a systematic review, meta-analysis, or both. | 1 |
| | | **ABSTRACT** | |
| Structured summary | 2 | Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number. | 1 |
| | | **INTRODUCTION** | |
| Rationale | 3 | Describe the rationale for the review in the context of what is already known. | 1-2 |
| Objectives | 4 | Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS). | 1-2 |
| | | **METHODS** | |
| Protocol and registration | 5 | Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number. | 2 |
| Eligibility criteria | 6 | Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale. | 2 |
| Information sources | 7 | Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched. | 3 |
| Search | 8 | Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated. | 3 |
| Study selection | 9 | State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis). | 3 |
| Data collection process | 10 | Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators. | 3 |
| Data items | 11 | List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made. | 3 |
| Risk of bias in individual studies | 12 | Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis. | 3 |
| Summary measures | 13 | State the principal summary measures (e.g., risk ratio, difference in means). | 3 |
| Synthesis of results | 14 | Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., $I^2$) for each meta-analysis. | 3 |
| Risk of bias across studies | 15 | Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies). | NA |
| Additional analyses | 16 | Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified. | 3-4 |
| | | **RESULTS** | |
| Study selection | 17 | Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram. | 4 |
| Study characteristics | 18 | For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations. | 4-5 |

| | | | |
|---|---|---|---|
| Risk of bias within studies | 19 | Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12). | 5 |
| Results of individual studies | 20 | For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot. | NA |
| Synthesis of results | 21 | Present results of each meta-analysis done, including confidence intervals and measures of consistency. | 6 |
| Risk of bias across studies | 22 | Present results of any assessment of risk of bias across studies (see Item 15). | NA |
| Additional analysis | 23 | Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]). | 7 |
| | | **DISCUSSION** | |
| Summary of evidence | 24 | Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers). | 7-8 |
| Limitations | 25 | Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias). | 7-8 |
| Conclusions | 26 | Provide a general interpretation of the results in the context of other evidence, and implications for future research. | 8 |
| | | **FUNDING** | |
| Funding | 27 | Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review. | 8 |

NA – Not applicable

*From:* Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit: **www.prisma-statement.org**.

Table S2. List of potentially relevant studies not included in the systematic review, along with the reasons for exclusion.

| Authors | Title | Exclusion reason |
|---|---|---|
| Leavitt et al. 2002 | A longitudinal evaluation of pulpal pain during orthodontic tooth movement | No clear aligners treatment |
| Wu et al. 2009 | A comparison of pain experienced by patients treated with labial and lingual orthodontic appliances | No clear aligners treatment |
| Wu et al. 2011 | Comparison of oral impacts experienced by patients treated with labial or customized lingual fixed orthodontic appliances | No clear aligners treatment |
| Feldmann et al. 2011 | Orthodontic anchoring techniques and its influence on pain, discomfort, and jaw function—a randomized controlled trial | No clear aligners treatment |
| Benson et al. 2012 | The effect of chewing gum on the impact, pain and breakages associated with fixed orthodontic appliances: a randomized clinical trial | No clear aligners treatment |
| Martorelli et al. 2013 | A comparison between customized clear and removable orthodontic appliances manufactured using RP and CNC techniques | No clear aligners treatment |
| Feldmann 2014 | Satisfaction with orthodontic treatment outcome | No VAS data |
| Al-Ma'ani 2014 | Pain Perception in Orthodontic Patients Treated by Fixed Orthodontic Appliances and It's Effect on Their Quality of Life | No VAS data |

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| Shedam et al. 2015 | The Effect of Chewing Gum on the Pain Associated With Initial Placement of Fixed Orthodontic Appliances | No clear aligners treatment |
| Wiedel et al. 2016 | A randomized controlled trial of self-perceived pain, discomfort, and impairment of jaw function in children undergoing orthodontic treatment with fixed or removable appliances | No clear aligners treatment |
| Sweeney et al. 2016 | Patient perceptions of speech, discomfort, and salivary flow while wearing Invisalign® aligners | Only clear aligners treatment |
| Nadeem et al. 2016 | Effect of Chewing Gum on Pain in Fixed Orthodontic Treatment | No clear aligners treatment |
| Alghamdi et al. 2017 | Comparison of oral health-related quality of life of patients treated by palatal expanders with patients treated by fixed orthodontic appliances | No VAS data |
| Johal et al. 2018 | Pain experience in adults undergoing treatment: A longitudinal evaluation | No clear aligners treatment |
| Alansari et al. 2018 | The effects of brief daily vibration on clear aligner orthodontic treatment | Only clear aligners treatment |
| Hosni et al. 2018 | Relevant research from orthodontic journals: focus on rate of tooth movement | No VAS data |
| Alajmi et al. 2019 | Comparison of short-term oral impacts experienced by patients treated with Invisalign or conventional fixed orthodontic appliances | No follow-up data |
| Diddige et al. 2020 | Comparison of pain levels in patients treated with 3 different orthodontic appliances – a randomized trial | No Mean and SD values |

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