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Author contribution

Protocol development: SNP, GNA, CM, TE; literature search: SNP, GNA; study selection: SNP, GNA; data extraction: SNP, GNA; resolve issues with selection/extraction: TE; statistical analysis: SNP; 1st manuscript draft: SNP; manuscript revision: GNA, CM, TE; pre-submission manuscript confirmation: SNP, GNA, CM, TE.

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Abstract

Objective: Aim of this study was to explore the methods, reporting, and transparency of clinical trials in orthodontics and compare them to the field of periodontics, as a standard within dentistry.

Design/setting: cross-sectional bibliographic study

Methods: A total of 300 trials published in 2017-2018 and evenly distributed in orthodontics and periodontics were selected, assessed, and analysed statistically to explore key aspects of the conduct and reporting of orthodontic clinical trials compared to trials in periodontics.

Results: Several aspects are often neglected in orthodontic and periodontic trials and could be improved upon, including use of statistical expertise (22.3% of assessed trials), blinding of outcome assessors (62.3%), prospective trial registration (12.0%), adequate sample size calculation (35.7%), adherence to CONSORT (14.3%) and open data sharing (4.3%). The prevalence of statistically significant findings among orthodontic and periodontic trials was 62.3%, which was significantly associated with several methodological traits like statistician involvement (Odds Ratio [OR]=0.5; 95% Confidence Interval [CI]=0.3-0.9), blind outcome assessor (OR=0.5; 95% CI=0.2-1.0), lack of prospective trial registration (OR=2.8; 95% CI=1.3-5.9), and non-adherence to CONSORT (OR=4.5; 95% CI=1.3-15.8).

Conclusions: Although trials in orthodontics seem to be significantly worse compared to periodontics in aspects like trial registration, adherence to CONSORT, and declaration of competing interests or financial support, their methods do seem to have improved considerably during the last years.

Keywords

clinical research; evidence-based medicine; randomised trials; reporting quality; dentistry; bias

MANUSCRIPT

Introduction

Clinical trials in human populations, and especially randomised ones, are regarded as the gold standard in comparative efficacy research and form the basis for translating research evidence into clinical practice (Schulz et al., 2010). Numerous guidelines have been developed in an effort to standardise and improve reporting of trials, such as the Consolidated Standards of Reporting Trials (CONSORT) statement (Schulz et al., 2010), which had a well-documented positive impact on the reporting quality of randomised trials (Turner et al., 2012).

Statistical significance of the results influences the attractiveness and consequent publication of research (Ioannidis, 2005). Albeit the commonality of this approach, it is accepted that interpretation based solely on P-values can be misleading (Rothman, 1978) and is usually made at the expense of other more meaningful measures, such as the effect size and the associated confidence intervals (Feinstein, 1998). The authors' perception of the 'attractiveness' of the results can lead to selective reporting of study findings (reporting bias) (Sterne et al., 2001). The study design is associated with reporting of significant results, with interventional studies, especially randomised clinical trials, being more likely to report non-significant results compared to observational or in vitro studies (Ioannidis et al., 2001; Papageorgiou et al., 2015b). This is an important finding with implications on appropriate interpretation of weaker designs and is in agreement with previous reports (Yuan et al., 2011). Misleading interpretation of weaker studies can be further exacerbated by the predominance of exaggerated treatment effects often associated with those studies compared to randomised controlled trials.

In dentistry, reporting quality of randomised trials has been assessed in a number of general and dental specialty journals (Sjögren and Halling, 2002; Lesaffre et al., 2007; Pandis et al., 2010), indicating that there is room for improvement. Additionally, comparisons among dental specialties indicate that trials in periodontics tend to be of higher methodological quality than in other dental fields (Pandis et al., 2010; Pandis et al., 2011; Koletsi et al., 2012; Fleming et al., 2013).

Therefore, aim of this cross-sectional bibliographic study was to explore the methods, reporting, and transparency of clinical trials in orthodontics and compare them to the field of periodontics, as a standard within dentistry.

Materials and methods

Sample size calculation

The sample size for this study was set a priori to be 300 published papers, evenly distributed in two dental disciplines: 150 papers for orthodontics and 150 papers for periodontics. This is based on previous data on this study's primary outcome (Papageorgiou et al., 2015) indicating that the proportion of studies reporting statistically significant results among interventional studies in dentistry is 61%. In order to identify a theoretical difference of 15% in reporting of statistically significant results between orthodontics and periodontics with a chi-square test, alpha set at 5% and beta at 20%, a total of 300 papers need to be included. We did not expect to have any dropouts, since we identified retrospectively the papers to be included until our goal was met.

Eligibility criteria

Eligible to be included in this study were published reports of clinical trials on human patients of any age/sex/ethnicity assessing the clinical effects of any orthodontic or periodontal intervention compared to any other intervention/control/placebo group. We excluded studies that do not assess treatment effects, study designs other than clinical trials (like case series, case reports), animal studies, and non-clinical studies (like in vitro studies, in silico studies, technical reports, reviews, bibliographical studies, etc). We did not set any limitation regarding publication language. As preliminary searches of the literature indicated that less than 150 clinical trials had been published in orthodontics in 2018, we extended our search window to 2017 too. We tried however to include the same number of orthodontic and periodontal studies for 2017 and 2018, in order to account for any temporal trends.

Literature search

We searched only MEDLINE through Pubmed on December 15th for clinical trials, using the sensitivity- and precision-maximizing search strategy for identifying randomised trials in PubMed (Lefebvre et al., 2011), with small modifications to exclude non-eligible study designs (Appendix 1). Then hits were imported in EndNote X7 (Thomson Reuters: Philadelphia, PA, USA) for de-duplication, and exported to spreadsheets.

Study selection, data extraction, and coding

Two authors independently selected eligible studies according to the pre-defined criteria. The first author (SNP) first scored studies for eligibility and performed data extraction, while the second (GNA) independently re-evaluated them. The last author (TE) was consulted to discuss / resolve any discrepancies. Data extraction from each included trial covered the following: demographics (continent of origin, number of authors, patients per trial group), methods (parallel design, trial registration, randomisation, blinded outcome assessment, sample size calculation), reporting/transparency (conflict of interest statement, funding, citing of CONSORT, open dataset provision), and results (statistically significant primary outcome of the trial at 5% and number of p-values reported in the trial) (Appendix 1). After completion of data extraction and check of data integrity, the dataset was coded by a third author (TE) not involved in data extraction, so that the any trial identifiers are masked before handing it back to the analyst (SNP).

Statistical analysis

We characterised descriptively all collected data pertaining to binary outcomes with the relative and absolute frequencies. For continuous outcomes, normal data distribution was checked by visual inspection and by running a Shapiro-Wilk test. As expected from similar studies, all three continuous variables (author number, patients per trial group, number of p-values) were found to be skewed and were therefore described with the median, Interquartile Range (IQR), and range. Crude inferential statistics included assessing differences in the trial characteristics and primary outcome with chi-square tests (or Fisher's exact test) for binary outcomes and Mann-Whitney test for continuous outcomes—both at alpha=5%. Furthermore, we employed logistic regression, after checking assumptions, on the primary outcome (statistically significant primary outcome results) to identify significant predictors using Odds Ratios (ORs) and their corresponding 95% Confidence Intervals (CIs). For the selection of significant predictors, we adopted arbitrarily a p-value < 0.05 or measures of model fit (a pseudo-R^2 of at least 0.01). Logistic regression models were run for each independent variable with all trials (both orthodontic and periodontic), except for cases were a significant interaction between independent variable and discipline was identified,

where analysis was limited to only orthodontic trials. All analyses were run by one author (SNP) in Stata 14 (Stata Corporation, College Station, TX, USA) and the study's dataset was made openly available through Zenodo (Papageorgiou et al., 2019).

Results

A total of 300 clinical trials were included in this study (Figure 1; Appendix 2), which were evenly distributed between orthodontics and periodontics (150 trials each), as well as between 2017 and 2018 (71 and 79 trials, respectively; Table 1). Demographically, most trials originated from Asia (51.3%; n=154), followed by Europe (30.3%; n=91), South America (11.0%; n=33), and North America (5.0%; n=15). They included a median of five authors (IQR 4-7 authors) with a range of 2-16 authors. The sample size per trial group/arm was on median 21 patients (IQR 15-31 patients) with a range of 3-342 patients. Significant differences were seen in their continent of origin between orthodontic and periodontic trials, where the former had a greater contribution from North America (8.0% vs 2.0%) and smaller from Asia (47.3% vs 55.3%). Also, orthodontic trials had significantly less authors than periodontic trials (medians of 5 vs 6 authors, respectively).

As far as statistical testing among included trials is concerned (Table 2), 62.3% of all trials (n=187) reported statistically significant results for the trial's primary outcome, while a median of 25 p-values from statistical comparisons were given per trial (IQR 11-56 p-values; range 1-742 p-values). No significant difference in the proportion of trials reporting statistically significant results could be seen between orthodontics and periodontics. However, orthodontic trials reported considerably fewer p-values than periodontic trials on average (medians of 17 vs 36 p-values, respectively).

As far as methods of included trials are concerned (Table 3), more than half of the trials were of parallel design (70.0%) and blinded the outcome assessor (62.3%). A statistician / methodologist was involved only in 22.3% of the trials and sample size calculations were presented in an adequate manner in 35.7% of the trials. Trials were registered in 45.0% of the cases, but only 12.0% of all trials had been registered a priori (before the trial had started). Significant differences were seen in the involvement of statistician / methodologist in trials between the two specialties, where orthodontic trials were more likely to involve one than periodontic ones (28.0% vs 16.7%). Finally, significantly less orthodontic trials were

registered compared to periodontic ones (34.0% vs 56.0%), but still only few either orthodontic or periodontic trials were prospectively registered (10.0% vs 14.0%).

Several issues existed on the reporting quality and transparency of included trials (Table 4). The CONSORT statement for reporting completeness was mentioned in only 14.3% of trials and only 45.3% of the trials even merely included a CONSORT flowdiagram. On the other side, conflicts of interests and sources of financial support were declared in 84% and 92.3% of trials, respectively. However, only very few trials openly shared their full dataset for transparency (5.0%) through either a dedicated repository or a journal appendix. Considerable differences existed between orthodontics and periodontics for all aspects of reporting / transparency. Orthodontic trials fared considerably worse than periodontic trials concerning CONSORT statement mention (8.7% vs 20.0%), conflicts of interest declaration (76.0% vs 92%), and financial support declaration (88.0% vs 96.7%). On the other side, more orthodontic trials tended to openly share their data than periodontic trials (7.4% vs 2.7%), even though data sharing rates were generally poor.

Certain methodological / reporting / transparency characteristics of the included trials were associated with reporting statistically significant trial findings (Appendix 3). Demographically, trials originating from Asia had higher odds of reporting significant findings than trials from Europe (OR=2.9; 95% CI=1.3-6.3). As far as methodology is concerned, lower odds of reporting significant findings were found for parallel trials compared to split-mouth/cross-over trials (OR=0.5; 95% CI=0.2-1.0), with involvement of a statistician / methodologist (OR=0.5; 95% CI=0.3-0.9), and with blinded outcome assessment (OR=0.5; 95% CI=0.2-1.0). On the other side, reporting of significant findings were associated with lack of trial registration (OR=2.8; 95% CI=1.3-5.9) or retrospective trial registration (OR=2.4; 95% CI=1.1-5.1) compared to prospective trial registration. Furthermore, trials without sample size calculation had higher odds of reporting significant results than trials with adequate sample size calculation (OR=3.2; 95% CI=1.3-7.7). Finally, trials that didn't mention / comply to the CONSORT statement had higher odds of reporting significant findings than trials based on CONSORT (OR=4.5; 95% CI=1.3-15.8).

Discussion

Demographics

The present cross-sectional bibliographic study evaluates the demographics, methodology, and reporting / transparency of 300 clinical trials published between 2017-2018 in the fields of orthodontics and periodontics. As far as demographics are concerned, the present study indicated that the majority of clinical trials originated from Asia (Table 1), while Europe, and South or North America contributed considerably less. Interestingly, and related to this finding, the majority of orthodontic systematic reviews or meta-analyses in the last decade have been produced in Europe and North America (Papageorgiou et al., 2011; 2014), which might indicate an overproduction of secondary research at the expense of the more useful primary research in orthodontics (Papageorgiou and Eliades, 2019). Also, according to the results of this study, orthodontic trials originating from Asia had higher odds of reporting significant findings that those originating from Europe (OR=2.9; 95% CI=1.3-6.3; Appendix 3). This is on par with empirical evidence indicating that trials from less developed countries show, on average, more favourable treatment effects than trials from more developed countries (Panagiotou et al., 2013), which might reflect biases in reporting and/or study design, differences in baseline risk, or differences in treatment implementation.

Statistical testing among clinical trials

The included clinical trials reported an average of 25 p-values from statistical testing (Table 2). More than half of included trials (62.3%) reported significant differences for the trial's primary outcome at the 5% level. It must be noted here that empirical evidence from various dental specialties indicates that non-randomised trials are much likely to find statistically significant differences compared to randomised ones (Papageorgiou et al., 2015a). This is important when critically appraising results originating from weaker designs and is further exacerbated by the fact that non-randomised trials tend to report inflated treatment benefits compared to randomised trials (Ioannidis et al., 2001; Papageorgiou et al., 2015b). Additionally, a very large number of p-values from hypothesis testing was usually reported in both orthodontic and periodontic trials (medians of 17 and 36 p-values, respectively), with significant differences among specialties. This could be potentially problematic, since multiple statistical testing might inflate the risk of false positive findings (finding a statistically significant effect by chance where none actually exists; or in formally, rejecting the individual null hypothesis although it is in fact true). If one significance test at the 5% level is performed, the probability of the type 1 (false positive) error is the comparison-wise error rate—here 5%. If on the other

hand 100 statistical tests are performed at the 5% level the probability of rejecting at least one of the 100 independent null hypotheses (when in fact all are true) amounts to 99.4%, while the number of false significance tests is per definition 5. This emphasises the need to carefully plan statistical tests in a clinical trial before its start or adjusting for multiple testing (Bender and Lange, 2001).

Clinical trial methodology

The superiority of randomised trials as a study design relies to a large extent on the transparency of the used methods, which entails a priori registration of the trial's protocol in a public domain to improve accountability in the conduct and reporting of research (De Angelis et al., 2004). This a priori trial registration can also be used post hoc to compare the original plan with subsequent procedures and analyses, thereby potentially reducing the risk of data dredging. A priori trial registration can additionally safeguard against bias-related phenomena such as delayed publication or nonpublication of trials, selective reporting of outcomes, manipulation of the analysis plan, and counting covert duplicate publications within systematic reviews as separate trials (Dwan et al., 2011). This is backed by empirical evidence that indicates that orthodontic trials that were registered reported significantly smaller treatment benefits compared to unregistered trials (Papageorgiou et al., 2018), which is a proxy for bias. Unfortunately, a priori registration of clinical trial has not yet been widely adopted in either orthodontics or periodontics, as the vast majority of clinical trials (55.0%) were not registered. Moreover, 33.0% of included trials seem to have been registered retrospectively – i.e. after the trial has started and in many instances many years after the trial has ended right before it is submitted to a journal. Compared to periodontics, orthodontics had more unregistered trials (66.0% to 44.0%), less retrospectively registered trials (24.0% to 42.0%) and similar percentage of prospectively registered trials (10.0% to 14.0%). It must be stressed out here that retrospective registration is a distortion of the scope behind trial registration and cannot safeguard against biases around the scientific procedure. The data of the present study showed that compared to prospectively registered orthodontic trials, both non-registered trials and retrospectively registered trials had higher odds of finding statistically significant findings (ORs of 2.8 and 2.4, respectively; Appendix 3). One can only wonder why post hoc registration of trials exists, since it might mislead editors and readers of trial reports in a false sense of a priori design. On the other hand, prohibiting retrospective trial registration

or publication of retrospectively registered trials might discourage the practice of trial registration, which is already poor in orthodontics (Papageorgiou et al., 2017), and lead to loss of existing unpublished trials. An easy solution to this dilemma might be to transparently include in the trial's report both the registration date and the enrolment date for the first trial participant (Harriman and Patel, 2016) and rely upon the critical appraisal skills of interested readers.

Clinical trials are a complex research design with several clinical or statistical aspects that need to be carefully planned and outlined before the trial commences. Therefore, it is often advisable that a statistician is involved in the research team from a very early stage to assist with the calculation of the needed sample size, the statistical analysis plan, and the trial's protocol in general. Unfortunately, a statistician seemed to be involved, as far as we could tell, in only a small portion of orthodontic or periodontic trials (22.3%), although this is on average more often in orthodontic trials than in periodontic trials (28.0% vs 16.7%). Trials where a statistician was involved reported less often statistically significant results in the present study (OR=0.5; 95% CI=0.3-0.9; p=0.01; Appendix 3), which might indicate more appropriate analytical methods and/or better control on false-positive discoveries. Finally, it might also be that inclusion of a statistician in the research team makes the authors more confident about the robustness of the trial's methods and 'not afraid' to report negative trial results.

The majority of current clinical trials in orthodontics / periodontics (70.0%) seem to be of parallel design, which means that each patient is strictly assigned to only one intervention or control group. Other designs of randomised trials like split-mouth or cross-over designs might be useful in an orthodontic setting, but require additional considerations for their planning, conduct, reporting, and analysis (Elbourne et al., 2002; Montgomery et al., 2003; Pandis et al., 2013; Pandis et al., 2017). Evidence from the current study indicated that parallel trials were less likely to report significant findings compared to split-mouth / cross-over trials (OR=0.5; 95% CI=0.2-1.0; Appendix 3). This could be attributed to increased power of split-mouth studies (Pandis et al., 2013), issues in the conduct/analysis of split-mouth studies (Lesaffre et al., 2007), or systematic differences between the study designs (Leyrat et al., 2018).

One of the biggest advantages of clinical trials over observational study designs pertains to the reliable measurement of the trial outcome, which is usually done by a blinded assessor. Blinding of outcome assessment has been empirically proven to safeguard against bias, especially when subjective outcomes

are assessed in a trial, and lack of blinding might lead to exaggerated treatment effects (Savović et al., 2012). Additionally, results of the current study indicated that trials that blinded the outcome assessor had lower odds of finding statistically significant results (OR=0.5; 95% CI=0.2-1.0; p=0.05; Appendix 3). Contrary to blinding of the patient or the treating clinician that might not be always feasible in orthodontics or periodontics for practical reasons, blinding of the outcome assessor is usually possible by ensuring that a third party not involved in treatment does all measurements and that no information of the group allocation can be gleamed from the cast models, radiographs, etc.

Finally, a priori calculation of the needed sample size is a crucial component of any clinical trial, as it ensures that the trial is fit to identify an existing difference between the compared treatments, while being cost-effective in terms of time, effort, and money invested in the trial. The current study indicated that sample size calculation was only infrequently employed appropriately in clinical trials: 29.0% reported no sample size calculation, 35.3% reported only partial details of sample size calculation that did not allow critical appraisal, and only 35.7% of the trials fully reported sample size calculation. This was very similar in both orthodontics and periodontics and indicates that there is room for improvement in this aspect. This need for improvement in sample size calculations is reinforced by the findings of the present study: compared to trials with adequately reported sample size calculations, trials that reported no sample size calculation had much higher odds of having statistically significant results (OR=3.2; 95% CI=1.3-7.7; P=0.01). This might be explained by small trials with inadequate sample sizes that are more prone to false-positive discoveries (Papageorgiou, 2018).

Reporting and transparency of clinical trials

Accurate and transparent research conduct and reporting are a foundation of health care decision making. For example, the CONSORT statement has been produced in an attempt to standardize and improve the reporting quality of clinical trials (Schulz et al., 2010). The CONSORT guidelines have been endorsed by over 580 journals (http://www.consort-statement.org/about-consort/endorsers) and there is evidence of a positive impact on the reporting of trials (Turner et al., 2012). The current study however indicated that only 14.3% of trials cited following the CONSORT statement which was significantly less in orthodontics compared to periodontics (8.7% vs 20.0%, respectively; Table 4). Additionally, orthodontic trials not

following the CONSORT statement had increased odds of reporting statistically significant findings compared to orthodontic trials that followed the CONSORT statement (OR=4.5; 95% CI=1.3-15.8; P=0.02; Appendix 3). This can probably however be attributed to an indirect improvement of the conduct of the clinical trial and not on citing the CONSORT statement per se. Journal editors could play an important role in improving compliance with reporting guidelines, suggesting or even making it compulsory for authors to submit both the CONSORT checklist and the CONSORT flow diagram as a requirement for a manuscript to be published.

Another important aspect for the transparency of clinical trials is the existence of any conflicts of interest—especially those pertaining to commercial interests. Among the included trials, 16.0% of them did not declare whether competing interests exist, while 7.7% of them did not declare if any financial support existed. These percentages are significantly higher in orthodontics than those in periodontics (24.0% vs 8.0% and 12.0% vs 3.3% for conflicts of interest and financial support, respectively; Table 4) and are pretty low, so that considerable room exists for improvement. It is here important to note that much of this variation in declaration rates for conflicts of interest / financial support might be attributed to journal-specific differences in the manuscript format, since many journals have specific fixed fields in the start or end of a paper to insert such declarations. Non-declared financial ties to companies that might be trying to promote their products undermine the integrity of the scientific procedure and might be a serious issue of misconduct. However, it must also be stressed out that clinical trials can still be supported from companies and at the same time maintain a high level of objectivity, robustness, and transparency.

In this endeavour towards transparent science, open provision of the full data of a trial is of paramount importance. Open data provision (Nosek et al., 2015; Papageorgiou and Cobourne, 2018) enables replication of findings and enhances the robustness of the scientific process and reduce reporting biases related to the statistical significance of the findings (Camerer et al., 2018). However, very few clinical trials currently openly provide their data and the majority (95%) does not, with somewhat higher provision of data for orthodontics compared to periodontics (7.4% vs 2.7%). It is therefore imperative that both journal editors and scientific institutions that support scientific research work together so that research data can be of maximum benefit to patients. At the same time, apart from data sharing being crucial to the scientific

process, it might also benefit the researchers themselves, since evidence exists that data sharing is associated with increased citation rates (Pinowar et al., 2007).

Conclusions

Overall, it is obvious that clinical research in orthodontics has seen vast improvements in the last years and currently is in many ways on par with periodontics, which was seen up to now as the gold standard in dental research. At the same time, there is large room for further improvements in many aspects of the conduct, reporting, and transparency of clinical trials. Combined efforts from authors, peer reviewers, journal editors, and institutions or scientific societies promoting research should be undertaken to maximize the benefit of our patients gained from clinical research.

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Figure Legends

Figure 1. Flow diagram for study identification and study selection.

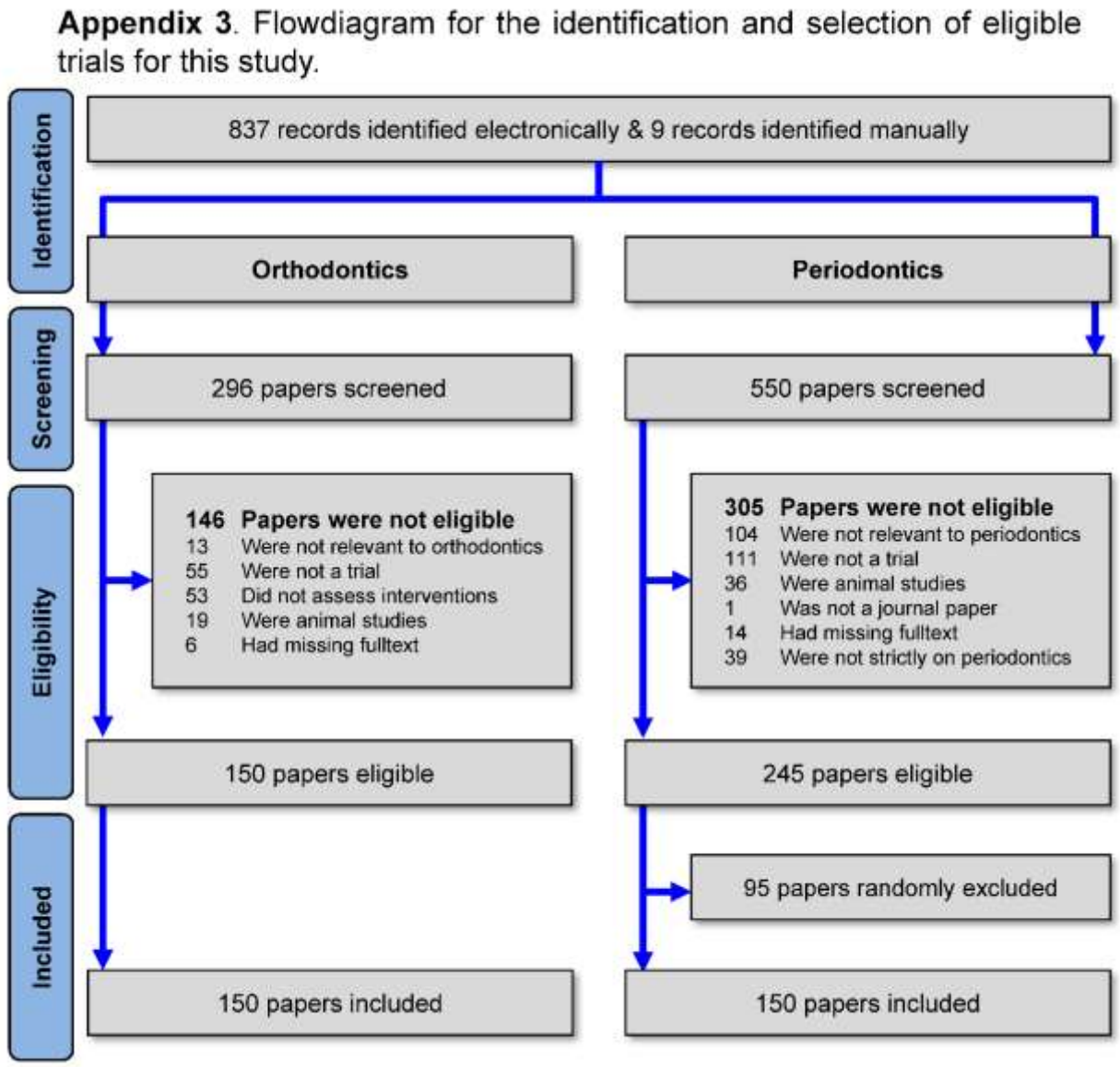

Table 1. Characteristics of the included trials pertaining to demographics.

		Total€	**Orthodontics†**	**Periodontics†**	**P-value**
Publication year	2017 - % [n]	47.3% [142]	47.3% [71]	47.3% [71]	1.00*
	2018 - % [n]	52.7% [158]	52.7% [79]	52.7% [79]	
Continent	Europe - % [n]	30.3% [91]	31.3% [47]	29.3% [44]	0.01£
	North America - % [n]	5.0% [15]	8.0% [12]	2.0% [3]	
	South America - % [n]	11.0% [33]	10.0% [15]	12.0% [18]	
	Asia - % [n]	51.3% [154]	47.3% [71]	55.3% [83]	
	Africa - % [n]	0.7% [2]	0% [0]	1.3% [2]	
	Oceania - % [n]	1.7% [5]	3.3% [5]	0% [0]	
Number of authors	Median (IQR)	5 (4-7)	5 (4-6)	6 (4-7)	0.01¥
	Range	2-16	2-15	2-16	
Patients per group§	Median (IQR)	21 (15-30)	20 (16-30)	22 (15-30)	0.84¥
	Range	3-342	3-342	6-132	

€ row percentage
† column percentage
* checked with chi-squared test
£ checked with Fisher's exact test
¥ checked with Mann-Whitney test
§ only parallel trials are analysed here (107 and 103 trials in orthodontics and periodontics, respectively), as the sample size of split-mouth / cross-over trials is otherwise used.
IQR, interquartile range.

Table 2. Proportion of included trials with statistically significant results for their primary outcome and number of p-values among included studies.

		Total€	**Orthodontics†**	**Periodontics†**	**P-value**
Significant results - % [n]	No	37.7% [113]	39.3% [59]	36.0% [54]	0.55*
	Yes	62.3% [187]	60.7% [91]	64.0% [96]	
Number of p-values	Median (IQR)	25 (11-56)	17 (8-42)	36 (18-68)	<0.001¥
	Range	1-742	1-540	2-742	

€ row percentage
† column percentage
* checked with chi-squared test
¥ checked with Mann-Whitney test

Table 3. Characteristics of the included trials pertaining to methods.

		Total[€]	Orthodontics[†]	Periodontics[†]	P-value
Statistician involved	No - % [n]	77.7% [233]	72.0% [108]	83.3% [125]	0.02*
	Yes - % [n]	22.3% [67]	28.0% [42]	16.7% [25]	
Parallel trial design	No - % [n]	30.0% [90]	31.3% [47]	28.7% [43]	0.61*
	Yes - % [n]	70.0% [210]	68.7% [103]	71.3% [107]	
Randomised trial	No - % [n]	2.0% [6]	3.3% [5]	0.7% [1]	0.21[£]
	Yes - % [n]	98.0% [294]	96.7% [145]	99.3% [149]	
Blind outcome assessor	No - % [n]	37.7% [113]	36.7% [55]	38.7% [58]	0.72*
	Yes - % [n]	62.3% [187]	63.3% [95]	61.3% [92]	
Registration	No - % [n]	55.0% [165]	66.0% [99]	44.0% [66]	0.001*
	Prospective - % [n]	12.0% [36]	10.0% [15]	14.0% [21]	
	Retrospective - % [n]	33.0% [99]	24.0% [36]	42.0% [63]	
Sample size calculation	No - % [n]	29.0% [87]	28.7% [43]	29.3% [44]	0.97*
	Adequate - % [n]	35.7% [107]	35.3% [53]	36.0% [54]	
	Partial - % [n]	35.3% [106]	36.0% [54]	34.7% [52]	

* checked with chi-squared test
[£] checked with Fisher's exact test

Table 4. Characteristics of the included trials pertaining to reporting / transparency.

		Total[€]	Orthodontics[†]	Periodontics[†]	P
CONSORT	No mention - % [n]	40.3% [121]	40.7% [61]	40.0% [60]	0.01*
	Flowdiagram - % [n]	45.3% [136]	50.7% [76]	40.0% [60]	
	Statement - % [n]	14.3% [43]	8.7% [13]	20.0% [30]	
Conflict of interest	Not declared - % [n]	16.0% [48]	24.0% [36]	8.0% [12]	<0.001[£]
	None existing - % [n]	81.7% [245]	75.3% [113]	88.0% [132]	
	Some existing - % [n]	2.3% [7]	0.7% [1]	4.0% [6]	
Financial support	Not declared - % [n]	7.7% [23]	12.0% [18]	3.3% [5]	0.02[£]
	None existing - % [n]	38.0% [114]	32.7% [49]	43.3% [65]	
	Non-financial - % [n]	34.0% [102]	36.0% [54]	32.0% [48]	
	Company involved - % [n]	20.3% [61]	19.3% [29]	21.3% [32]	
Open data	No - % [n]	95.0% [285]	92.7% [139]	97.3% [146]	0.09[£]
	Yes; repository - % [n]	0.7% [2]	0.7% [1]	0.7% [1]	
	Yes; appendix - % [n]	4.3% [13]	6.7% [10]	2.0% [3]	

* checked with chi-squared test
[£] checked with Fisher's exact test

Appendix 1. Details on materials / methods of this study and deviations from protocol

Literature search

We searched only MEDLINE through Pubmed on December 15th for clinical trials, using the sensitivity- and precision-maximizing search strategy for identifying randomized trials in PubMed (Lefebvre et al. 2011), with small modifications to exclude non-eligible study designs (Appendix 1): "(randomized controlled trial[pt] OR controlled clinical trial[pt] OR randomized[tiab] OR placebo[tiab] OR clinical trials as topic[mesh:noexp] OR randomly[tiab] OR trial[ti] NOT (animals[mh] NOT humans [mh])) NOT (systematic review*[tiab] OR systematic literature[tiab] OR meta-analysis[tiab] OR meta-analyses[tiab] OR in vitro[tiab]) AND (orthodont*[tiab] OR periodont*[tiab]) AND ("2017"[Date - Publication] : "3000"[Date - Publication]). The above search strategy was used in Pubmed, the hits were extracted and imported in EndNote X7 (Thomson Reuters: Philadelphia, PA, USA) to eliminate duplicates, and exported to a spreadsheet.

Outcomes

The primary outcome of this study was the reporting of a statistically significant difference of the clinical trial's primary outcome ($P<0.05$). When an article contains both statistically significant and statistically non-significant results, the decision will be based on the primary outcome comparison or the first reported result, if no distinction between primary and secondary outcomes is provided. When a sample size calculation was performed in the assessed trial, this was deemed to be based on the trial's primary outcome.

We also noted/extracted the following secondary variables:

- Continent of origin for the trial: this was based on the location the trial was conducted in and obtained ethical approval.
- Number of authors included in the study. If an author consortium was listed among authors, we took this as one author.
- Involvement of a statistician: we noted if a statistician / epidemiologist / methodologist was included in the research team. This was based on the affiliations of the authors or any acknowledgements done specifically for assistance in the statistical analysis of the data.

- Parallel trial design: we noted if a trial had a parallel group design or not. Non-parallel designs included all other designs, including among others within-person randomized trials (split-mouth), cross-over, etc.
- Proportion of studies that are truly randomized trials: we assessed this by searching for any mention of random patient allocation into treatment and/or control or placebo groups. We did not assess if randomization was adequate according to the Cochrane risk of bias guidelines, as this fell outside the scope of this study.
- Proportion of studies that report blinded outcome assessor: we assessed this by searching for any mention of blinded/masked outcome measurement. We did not judge the blinding of participants or personnel, since this might not be consistently possible in dental clinical trials. We did not assess if outcome assessor blinding was adequate according to the Cochrane risk of bias guidelines, as this fell outside the scope of this study.
- Proportion of studies that have been registered: we noted if the study has been registered in any open special repository for clinical trial protocols like ClinicalTrials.gov, IRCTN, CTRI, etc. We also assessed if the study has been registered a priori (prior to study initiation). We rated a trial registration as prospective if registration took place prior to patient recruitment start or within the same month.
- Proportion of studies that report on a sample size calculation: we noted if a sample size calculation was reported in the study. We included only sample size calculations that were explicitly stated or implied as a priori. Post hoc calculations of power of a trial (reported in the Results or Discussion usually) were not included. We also noted if the sample size calculation was sufficiently described to allow replication.
- Number of included patients per trial group: this was calculated as the analyzed number of patients in a parallel trial's group (averaged among groups) or as the whole patient sample for cross-over/split-mouth trials. When discrepancies existed between randomized and analyzed patients, we tried to include the latter in all instances.
- Conflict of interest: we noted if a trial report was accompanied by a declaration of competing interests or conflicts of interest and categorized this as (a) no declaration, (b) declaration of no conflict, and (c) declaration of some conflict (subjectively assessed).

- Funding source: we noted if any funding was declared for this trial and categorized this as (a) no declaration, (b) declaration of no funding, and (c) declaration of company involvement by any means in the trial. If a trial made no declaration about funding, but made a declaration reporting no conflicts of interest, we noted the funding source also as 'no funding'.
- Proportion of studies that cite the CONSORT statement: we merely noted if a study cites the CONSORT statement in its text as used methods. We also noted if instead of the CONSORT statement, the trialists used a flowdiagram according to CONSORT (i.e. a flow diagram from patient selection, allocation, treatment, and follow-up—with patient numbers for at least one phase), even if they did not term it according to CONSORT. We did not assess if a study completely adheres to the CONSORT statement for each specific item of the statement.
- Proportion of studies that openly provide their dataset: we noted if the authors of the study report in the paper that the full dataset of the study can openly be found anywhere. We also noted if the study's dataset is available in a specialized repository (like Mendeley Data, Zenodo, Dryad, etc) or given as part of the part in a Table or online Appendix.
- Number of p values from statistical tests reported in the paper: we counted the number of p values from statistical testing (even if those are not accurately given numerically, but were given as notations of significance) that pertain to the results of the trial and are reported in the Results / Discussion / Figures / Tables / Appendix section of the paper, counting each p value once. We also counted p all values from multiple testing across groups/timepoints, even if the authors reported only the statistically significant ones. We excluded p values from statistical testing that is used for diagnostics, data distribution, or baseline differences.

Changes from the protocol

- We had initially planned also to note any deviations in the published trial report compared to the initially registered protocol of the included trials. This was abandoned for no specific reason other than time pressure to complete the study.
- We chose post hoc after protocol submission (but prior to study selection or data extraction) to also extract data regarding continent of origin, involvement of a statistician, trial design (parallel or not),

declaration of conflict of interest, declaration of funding, and number of patients included in each trial's group. This was based on content knowledge and critical evaluation, but not on data from this study.

- For reasons of analysis and to make the study more focused we altered somewhat the nomenclature of variables extracted and analyzed. We kept the initial primary outcome (reporting of statistically significant results for the trial's primary outcome), but dropped the variables listed in the protocol as 'secondary outcomes' to simple characteristics of the included trials. We still assessed statistically crude differences for all characteristics of included trials between orthodontics and periodontics, but we analysed only the primary outcome for the main inferential statistics.
- We originally planned to conduct also multivariable regression analyses, but we abandoned them to avoid overly multiple testing.

Appendix 2. List of excluded/included studies, with reasons.

Nr	Paper	Status
1	Hovell MF, Schmitz KE, Liles S, Robusto K, Hofstetter CR, Nichols JF, et al. A randomized controlled trial of orthodontist-based brief advice to prevent child obesity. Contemp Clin Trials. 2018;70:53-61.	Excluded; not related to orthodontics
2	Oh S, Gu Y, Perinpanayagam H, Yoo YJ, Lee Y, Kim RK, et al. Dentinal tubule sealing effects of 532-nm diode-pumped solid-state laser, gallic acid/Fe(3+) complex, and three commercial dentin desensitizers. Lasers Med Sci. 2018;33(6):1237-44.	Excluded; not related to orthodontics
3	Sakio R, Sakamoto Y, Ogata H, Sakamoto T, Ishii T, Kishi K. Effect of Platelet-Rich Plasma on Bone Grafting of Alveolar Clefts. J Craniofac Surg. 2017;28(2):486-8.	Excluded; not related to orthodontics
4	Wieckiewicz M, Boening KW, Grychowska N, Paradowska-Stolarz A. Clinical Application of Chitosan in Dental Specialities. Mini Rev Med Chem. 2017;17(5):401-9.	Excluded; not related to orthodontics
5	Abbate GM, Mangano A, Sacerdote P, Amodeo G, Moschetti G, Levrini L. Substance P expression in the gingival tissue after upper third molar extraction: effect of ketoprofen, a preliminary study. J Biol Regul Homeost Agents. 2017;31(1):239-44.	Excluded; not related to orthodontics
6	Alcantara CEP, Castro MAA, Noronha MS, Martins-Junior PA, Mendes RM, Caliari MV, et al. Hyaluronic acid accelerates bone repair in human dental sockets: a randomized triple-blind clinical trial. Braz Oral Res. 2018;32:e84.	Excluded; not related to orthodontics
7	Chen QX, Zhou ZB, Zhou YH. [A study on effects of immediate bone grafting at mandibular first molar fresh extraction socket on maintaining alveolar bone height after space closure]. Zhonghua Kou Qiang Yi Xue Za Zhi. 2017;52(11):649-55.	Excluded; not related to orthodontics
8	Fu CS, Liu RS, Luo Y, Ou L, Li YC, Zhang XH. [Changes of cementum endotoxin levels in different teeth with periodontitis treated with root conditioning]. Shanghai Kou Qiang Yi Xue. 2017;26(2):175-9.	Excluded; not related to orthodontics
9	Greenberg JR, Sinclair S, Janssen CA, Krick K, O'Brien M, Flanagan K, et al. An Electronic Screening System for Oral Health Examination and Collection of Critical Data in a Nonclinical Setting: Validation Trial. Compend Contin Educ Dent. 2018;39(5):318-24.	Excluded; not related to orthodontics
10	Matsumoto H, Kasai T, Suda S, Yatsu S, Shitara J, Murata A, et al. Randomized controlled trial of an oral appliance (SomnoDent) for sleep-disordered breathing and cardiac function in patients with heart failure. Clin Cardiol. 2018;41(8):1009-12.	Excluded; not related to orthodontics
11	Oliadarani FK, Haghgoo R, Mashhadiabbas F, Kahvand M. Histopathological Evaluation of Dental Pulp of Primary Teeth Pulpotomized with Formocresol with/without a Capping Agent: A Randomized Clinical Trial. J Int Soc Prev Community Dent. 2018;8(5):420-3.	Excluded; not related to orthodontics
12	Tadikonda A, Pentapati KC, Urala AS, Acharya S. Anti-plaque and anti-gingivitis effect of Papain, Bromelain, Miswak and Neem containing dentifrice: A randomized controlled trial. J Clin Exp Dent. 2017;9(5):e649-e53.	Excluded; not related to orthodontics
13	Teusner DN, Ju X, Brennan DS. Dental responsibility loadings and the relative value of dental services. Aust Dent J. 2017;62(3):372-7.	Excluded; not related to orthodontics
14	Alhasyimi AA, Pudyani PS, Hafizi I. Effect of mangosteen peel extract as an antioxidant agent on the shear bond strength of orthodontic brackets bonded to bleached teeth. Dental Press J Orthod. 2018;23(5):58-64.	Excluded; not a trial
15	Alkan O, Coven BO, Ozcopur B, Kazanci F, Kaya Y, Aydogan C, et al. Effects of Ozone and Prophylactic Antimicrobial Applications on Shear Bond Strength of Orthodontic Brackets. Turk J Orthod. 2017;30(4):101-5.	Excluded; not a trial
16	Almeida Mesquita J, Lacerda-Santos R, Pina Godoy G, Franscisco Weege Nonaka C, Muniz Alves P. Morphological and immunohistochemical analysis of the biocompatibility of resin-modified cements. Microsc Res Tech. 2017;80(5):504-10.	Excluded; not a trial
17	Alshahrani I, Abdelaziz K, Asiry MA, AlShikh AJA, AlGhamdi W, Mansour HA. Effects of Different Stain Removal Protocols on Bonding Orthodontic Brackets to Enamel. J Contemp Dent Pract. 2018;19(7):762-7.	Excluded; not a trial
18	Arash V, Naghipour F, Ravadgar M, Karkhah A, Barati MS. Shear bond strength of ceramic and metallic orthodontic brackets bonded with self-etching primer and conventional bonding adhesives. Electron Physician. 2017;9(1):3584-91.	Excluded; not a trial
19	Asiry MA, AlShahrani I, Alaqeel SM, Durgesh BH, Ramakrishnaiah R. Effect of two-step and one-step surface conditioning of glass ceramic on adhesion strength of orthodontic bracket and effect of thermo-cycling on adhesion strength. J Mech Behav Biomed Mater. 2018;84:22-7.	Excluded; not a trial
20	Dias AP, Paschoal MAB, Diniz RS, Lage LM, Goncalves LM. Antimicrobial action of chlorhexidine digluconate in self-ligating and conventional metal brackets infected with Streptococcus mutans biofilm. Clin Cosmet Investig Dent. 2018;10:69-74.	Excluded; not a trial
21	Ghasemi T, Arash V, Rabiee SM, Rajabnia R, Pourzare A, Rakhshan V. Antimicrobial effect, frictional resistance, and surface roughness of stainless steel orthodontic brackets coated with nanofilms of silver and titanium oxide: a preliminary study. Microsc Res Tech. 2017;80(6):599-607.	Excluded; not a trial
22	Giannetti L, Murri Dello Diago A, Silingardi G, Spinas E. "Superficial infiltration to treat white hypomineralized defects of enamel: clinical trial with 12-month follow-up. J Biol Regul Homeost Agents. 2018;32(5):1335-8.	Excluded; not a trial
23	Gupta AK, Shukla G, Sharma P, Gupta AK, Kumar A, Gupta D. Evaluation of the Effects of Fluoride Prophylactic Agents on Mechanical Properties of Nickel Titanium Wires using Scanning Electron Microscope. J Contemp Dent Pract. 2018;19(3):283-6.	Excluded; not a trial
24	Hedayati Z, Farjood A. Evaluation of Microleakage under Orthodontic Brackets Bonded with Nanocomposites. Contemp Clin Dent. 2018;9(3):361-6.	Excluded; not a trial
25	Higa RH, Henriques JFC, Janson G, Matias M, de Freitas KMS, Henriques FP, et al. Force level of small diameter nickel-titanium orthodontic wires ligated with different methods. Prog Orthod. 2017;18(1):21.	Excluded; not a trial
26	Kaura AS, Srinivasa DR, Kasten SJ. Optimal Timing of Alveolar Cleft Bone Grafting for Maxillary Clefts in the Cleft Palate Population. J Craniofac Surg. 2018;29(6):1551-7.	Excluded; not a trial
27	Kim J, Park C, Lee JS, Ahn J, Lee Y. The Effect of Various Types of Mechanical and Chemical Preconditioning on the Shear Bond Strength of Orthodontic Brackets on Zirconia Restorations. Scanning. 2017;2017:6243179.	Excluded; not a trial
28	Kim NH, Kim YJ, Lee DY. Bond Strengths of Orthodontic Metal Brackets to Tribochemically Silica-coated Zirconia Surfaces Using Different 10-Methacryloyloxydecyl Dihydrogen Phosphate-containing Primers. J Adhes Dent. 2017;19(1):21-9.	Excluded; not a trial
29	Latic Hodzic L, Ionescu AC, Brambilla E, Basso M, Gabric D, Mestrovic S. Shear Bond Strength of Orthodontic Brackets Luted with RMGIC After Er:YAG Laser Etching with Two Pulse Modes Using a Digitally Controlled "X-Runner" Handpiece. Photomed Laser Surg. 2018;36(11):608-13.	Excluded; not a trial
30	Liu L, Zou M. [Electronic probe analysis of enamel remineralization effect of casein phosphopeptide-amorphous calcium phosphate promoted by different concentrations of fluorine]. Zhonghua Kou Qiang Yi Xue Za Zhi. 2018;53(7):470-4.	Excluded; not a trial
31	Mahmoudzadeh M, Rezaei-Soufi L, Farhadian N, Jamalian SF, Akbarzadeh M, Momeni M, et al. Effect of CO2 Laser and Fluoride Varnish Application on Microhardness of Enamel Surface Around Orthodontic Brackets. J Lasers Med Sci. 2018;9(1):43-9.	Excluded; not a trial
32	Mirhashemi A, Chiniforush N, Jadidi H, Sharifi N. Comparative study of the effect of Er:YAG and Er:Cr;YSGG lasers on porcelain: etching for the bonding of orthodontic brackets. Lasers Med Sci. 2018;33(9):1997-2005.	Excluded; not a trial
33	Mohammadi N, Farahmand Far MH. Effect of fluoridated varnish and silver diamine fluoride on enamel demineralization resistance in primary dentition. J Indian Soc Pedod Prev Dent. 2018;36(3):257-61.	Excluded; not a trial
34	Mohebi S, Shafiee HA, Ameli N. Evaluation of enamel surface roughness after orthodontic bracket debonding with atomic force microscopy. Am J Orthod Dentofacial Orthop. 2017;151(3):521-7.	Excluded; not a trial
35	Moradi M, Hormozi E, Shamohammadi M, Rakhshan V. Effects of debonding of orthodontic brackets on topography and surface roughness of composite restorations. Int Orthod. 2018;16(4):623-37.	Excluded; not a trial
36	Posnick JC, Kinard BE. Orthognathic Surgery Has a Significant Positive Effect on Perceived Personality Traits and Perceived Emotional Expressions in Long Face Patients. J Oral Maxillofac Surg. 2018.	Excluded; not a trial
37	Prato GP, Zuccati G, Clauser C. Commentary: A Translational Medicine Approach to Tooth Transplantation. J Periodontol. 2017;88(6):519-25.	Excluded; not a trial
38	Rabiee SM, Eftekhari SZ, Arash V, Amozegar N, Fathi A, Tavanafar S, et al. Effect of CO2 laser power intensity on the surface morphology and friction behavior of alumina ceramic brackets. Microsc Res Tech. 2017;80(8):923-9.	Excluded; not a trial
39	Robaski AW, Pamato S, Tomas-de Oliveira M, Pereira JR. Effect of saliva contamination on cementation of orthodontic brackets using different adhesive systems. J Clin Exp Dent. 2017;9(7):e919-e24.	Excluded; not a trial
40	Salama F, Alrejaye H, Aldosari M, Almosa N. Shear bond strength of new and rebonded orthodontic brackets to the enamel surfaces. J Orthod Sci. 2018;7:12.	Excluded; not a trial
41	Sallam RA, Arnout EA. Effect of Er: YAG laser etching on shear bond strength of orthodontic bracket. Saudi Med J. 2018;39(9):922-7.	Excluded; not a trial
42	Sarul M, Lewandowska B, Kawala B, Kozanecka A, Antoszewska-Smith J. Objectively measured patient cooperation during early orthodontic treatment: Does psychology have an impact? Adv Clin Exp Med. 2017;26(8):1245-51.	Excluded; not a trial
43	Shamsedin M, Arash V, Jahromi MB, Moghadamnia AA, Kamel MR, Ezoji F, et al. Efficacy of quercetin flavonoid in recovering the postbleaching bond strength of orthodontic brackets: A preliminary study. J Orthod Sci. 2017;6(1):16-21.	Excluded; not a trial
44	Taha AA, Fleming PS, Hill RG, Patel MP. Enamel Remineralization with Novel Bioactive Glass Air Abrasion. J Dent Res. 2018;97(13):1438-44.	Excluded; not a trial
45	Taha AA, Hill RG, Fleming PS, Patel MP. Development of a novel bioactive glass for air-abrasion to selectively remove orthodontic adhesives. Clin Oral Investig. 2018;22(4):1839-49.	Excluded; not a trial
46	Topolski F, Moro A, Correr GM, Schimim SC. Optimal management of orthodontic pain. J Pain Res. 2018;11:589-98.	Excluded; not a trial

47	Wu HM, Ye C, Chen D. [Comparative study of enamel discoloration related to bonding with different orthodontic adhesives and cleaning-up with different procedures]. Shanghai Kou Qiang Yi Xue. 2018;27(3):257-60.	Excluded; not a trial
48	Xu Z, Li J, Fan X, Huang X. Bonding Strength of Orthodontic Brackets on Porcelain Surfaces Etched by Er:YAG Laser. Photomed Laser Surg. 2018;36(11):601-7.	Excluded; not a trial
49	Abdulraheem S, Bondemark L. Hawthorne effect reporting in orthodontic randomized controlled trials: truth or myth? Blessing or curse? Eur J Orthod. 2018;40(5):475-9.	Excluded; not a trial
50	Abdulraheem S, Bondemark L. The reporting of blinding in orthodontic randomized controlled trials: where do we stand? Eur J Orthod. 2018.	Excluded; not a trial
51	Abu-Alhaija E, Jaradat M, Alwahadni A. An Ex-vivo Shear and tensile bond strengths of orthodontic molar tubes bonded using different techniques. J Clin Exp Dent. 2017;9(3):e448-e53.	Excluded; not a trial
52	Al-Moghrabi D, Johal A, Fleming PS. What are people tweeting about orthodontic retention? A cross-sectional content analysis. Am J Orthod Dentofacial Orthop. 2017;152(4):516-22.	Excluded; not a trial
53	Batista K, Lima T, Palomares N, Carvalho FA, Quintao C, Miguel JAM, et al. Herbst appliance with skeletal anchorage versus dental anchorage in adolescents with Class II malocclusion: study protocol for a randomised controlled trial. Trials. 2017;18(1):564.	Excluded; not a trial
54	Bondemark L, Abdulraheem S. Intention to treat (ITT) analysis as reported in orthodontic randomized controlled trials-evaluations of methodology and recommendations for the accurate use of ITT analysis and handling dropouts. Eur J Orthod. 2018;40(4):409-13.	Excluded; not a trial
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Appendix 3. Univariable logistic regression modelling with reporting a statistically significant primary outcome of a trial as dependent variable and trial characteristics as independent variables.

Independent variable	Category	OR (95% CI)	P value	Pseudo R^2
None	Intercept	1.65 (1.31-2.09)	<0.001	0.0000
Discipline	Periodontics	Referent		
	Orthodontics	0.87 (0.54-1.38)	0.55	0.0009
Publication year	2017	Referent		
	2018	1.15 (0.72-1.84)	0.55	0.0009
Continent*	Europe	Referent		0.0506
	North America	0.81 (0.23-2.93)	0.75	
	South America	1.70 (0.52-5.55)	0.38	
	Asia	2.90 (1.34-6.27)	0.01	
	Africa	NC		
	Oceania	4.55 (0.47-43.78)	0.19	
Number of authors (log)	Per log unit	1.26 (0.73-2.16)	0.41	0.0017
Statistician involvement	No	Referent		0.0155
	Yes	0.50 (0.29-0.86)	0.01	
Parallel design*	No	Referent		0.0200
	Yes	0.47 (0.22-1.00)	0.05	
Blind outcome assessor*	No	Referent		0.0194
	Yes	0.50 (0.24-1.01)	0.05	
Trial registration	Prospective	Referent		0.0192
	No registration	2.80 (1.34-5.85)	0.006	
	Retrospective	2.35 (1.08-5.11)	0.03	
Sample size calculation*	Adequate	Referent		0.0363
	None	3.18 (1.31-7.73)	0.01	
	Inadequate	1.30 (0.61-2.78)	0.50	
Patients per group (log)	Per log unit	1.35 (0.90-2.05)	0.15	0.0053
Conflict of interest	No declaration	Referent		0.0027
	None existing	1.34 (0.72-2.51)	0.36	
	Some existing	1.94 (0.34-11.04)	0.45	
Financial support	No declaration	Referent		0.0006
	None existing	1.09 (0.44-2.76)	0.84	
	Non-financial	1.00 (0.39-2.52)	0.99	
	Company involved	1.14 (0.42-3.06)	0.80	
CONSORT use*	Statement	Referent		0.0430
	No	4.50 (1.28-15.78)	0.02	
	Flowdiagram	1.87 (0.56-6.25)	0.31	
Open data provision	No	Referent		0.0040
	Yes	0.70 (0.41-1.22)	0.21	
Number of p values (log)	Per log unit	1.05 (0.87-1.28)	0.61	0.0006

The variable 'randomized trial' was omitted, as it cannot be calculated.
* limited to orthodontic trials, due to a significant interaction of this variable with specialty.
OR, odds ratio.