Social media and orthodontics: A commentary on a systematic review

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Practice points

- This systematic review concluded that social media represent a basic resource for exchanging knowledge on a wide variety of patient-centred issues relating to orthodontics.
- The quality of evidence in the included studies was predominantly of low to moderate quality.
- Our critical appraisal identified eight key shortcomings of this review, which downgrade the trustworthiness of the findings of this paper. These shortcomings and the low to moderate quality of the evidence should be carefully weighed when implementing the findings of this systematic review.

Abstract

Data sources The electronic databases MEDLINE, EMBASE, Google Scholar, the Cochrane Oral Health Group's Trials Register, and CENTRAL from 1946 to 31 March 2018 were searched to identify eligible studies. Information sources in the Grey literature were also searched.

Study selection Randomised and non-randomised studies as well as retrospective studies irrespective of their language were selected by two reviewers independently.

Data extraction and synthesis Data extraction and risk of bias assessments were performed by two reviewers independently. Data were synthesised qualitatively. Quantitative syntheses were not possible because of high heterogeneity.

Results One randomised controlled trial, four cross-sectional studies, and three retrospective studies were selected according to the eligibility criteria. The quality of the evidence in the included studies was predominantly of low to moderate quality. All studies reported on Twitter, three on YouTube, two on Facebook and one study referred also to Google+, Pinterest, Instagram, and Internet Blogs. The included studies reported on the informational value of social media on various aspects of orthodontic treatment and patients' health experiences during orthodontic treatment.

Conclusions The authors of this review concluded that social media represent a basic resource for exchanging knowledge on a wide variety of aspects of orthodontics.

Commentary

Objectives and key findings of the systematic review

The potential role of social media's role in orthodontics is an important research topic not only for patients, but also for clinicians, researchers, and research sponsors. The objectives of this systematic review by Papadimitriou *et al.*[1] was to assess the interrelationship between orthodontics and social media in relation to (1) the use of social media by patients and potential patients to obtain information on orthodontics (2) the type and quality of the information obtained and (3) how this information is used and how it influences these stakeholders. One randomised controlled trial, four cross-sectional studies, and three retrospective studies were identified to address these objectives. Evidence was predominantly rated as low to moderate quality. The authors concluded that social media represent a basic resource for exchanging knowledge on a wide variety of items on orthodontics.

Methods of our critical appraisal of this systematic review

In this commentary we assessed how this systematic review was reported using the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) checklist.[2,3] We further appraised the methodological validity and the risk of bias of this review with the AMSTAR 2[4] and the ROBIS[5,6] tools, respectively. All reporting and quality assessments were conducted by two reviewers (RMR and LI) independently. Disagreements between these two operators were resolved through discussions till consensus was reached.

Key findings of our critical appraisal of the systematic review

Tables 1, 2 and 3 report the findings of our critical appraisals and Table 4 summarises the following eight key limitations of this review. First, it was not reported whether research methods were pilot tested. Such tests are important for the fine-tuning of the methods and for the calibration of the two operators who select eligible studies and extract data. Second, adverse effects of interventions were not assessed. Adverse effects should have been assessed to give a balanced perspective on the use of social media in orthodontics. Third, the review protocol was not registered nor was it published *a priori*. This shortcoming could have introduced bias related to selective reporting of outcomes and the risk of possible post-hoc changes in the review that are not congruent with the original protocol.[7] Fourth, almost 90% (249/279) of studies were excluded based on a screening of titles only. This method could have excluded potentially eligible studies and therefore have introduced 'selection bias', that is, the eight included studies in this review could be just a selective sample

GRADE rating ⬤ ⬤ ⬤ ◯

Table 1 PRISMA checklist scores for the systematic review by Papadimitriou 2019 et al.[1]

Item	Number	Reporting score*
Title		
Title	1	Reported
Abstract		
Structured summary	2	Reported
Introduction		
Rationale	3	Reported
Objectives	4	Partially reported
Methods		
Protocol and registration	5	Reported
Eligibility criteria	6	Reported
Information sources	7	Reported
Search	8	Reported
Study selection	9	Reported
Data collection process	10	Reported
Data items	11	Reported
Risk of bias in individual studies	12	Reported
Summary measures	13	Reported
Synthesis of results	14	Reported
Risk of bias across studies	15	Reported
Additional analyses	16	Not applicable
Results		
Study selection	17	Not reported
Study characteristics	18	Reported
Risk of bias within studies	19	Partially reported
Results of individual studies	20	Reported
Synthesis of results	21	Not applicable
Risk of bias across studies	22	Not reported
Additional analysis	23	Not applicable
Discussion		
Summary of evidence	24	Not reported
Limitations	25	Reported
Conclusions	26	Reported
Funding		
Funding	27	Reported

*Each PRISMA checklist item was scored as either 1) reported 2) not reported 3) partially reported 4) not applicable[16]

Table 2 AMSTAR 2 scores for the systematic review by Papadimitriou 2019 et al.[1]

Amstar questions	Scores
Q1. Did the research questions and inclusion criteria for the review include the components of PICO?	Yes
Q2. Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?	No
Q3. Did the review authors explain their selection of the study designs for inclusion in the review?	Yes
Q4. Did the review authors use a comprehensive literature search strategy?	Yes
Q5. Did the review authors perform study selection in duplicate?	Yes
Q6. Did the review authors perform data extraction in duplicate?	Yes
Q7. Did the review authors provide a list of excluded studies and justify the exclusions?	No
Q8. Did the review authors describe the included studies in adequate detail?	Yes
Q9. For RCTs*: Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?	Yes
Q9. For NRSI**: Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?	No
Q10. Did the review authors report on the sources of funding for the studies included in the review?	Yes
Q11. For RCTs*: If meta-analysis was performed did the review authors use appropriate methods for statistical combination of results?	No meta-analysis conducted
Q11. For NRSI**: If meta-analysis was performed did the review authors use appropriate methods for statistical combination of results?	No meta-analysis conducted
Q12. If meta-analysis was performed, did the review authors assess the potential impact of RoB in individual studies on the results of the meta-analysis or other evidence synthesis?	No meta-analysis conducted
Q13. Did the review authors account for RoB in individual studies when interpreting/discussing the results of the review?	Yes
Q14. Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?	Yes
Q15. If they performed quantitative synthesis did the review authors carry out an adequate investigation of publication bias (small study bias) and discuss its likely impact on the results of the review?	No meta-analysis conducted
Q16. Did the review authors report any potential sources of conflict of interest, including any funding they received for conducting the review?	Yes

* RCTs: Randomised Controlled Trials
**NRSI: Non-Randomised Studies of Interventions

of a larger group of eligible studies. Study selection based on screening of titles only is also not in agreement with Cochrane's typical procedure of selecting studies, that is, examining both the titles and abstracts of research studies to remove the irrelevant reports.[8] Fifth, the authors gave only the references with rationale

of 4, but not of all excluded studies. This lack of reporting jeopardises the reproducibility of the review. Researchers who want to update this review like to see the references of all papers that were excluded in the review with rationale. Sixth, risk of bias for the one included randomised controlled trial was assessed with an outdated 2011 Cochrane risk of bias (RoB) tool for randomised controlled trials.[9] Since the publication of this 2011

Table 3 Tabular presentation for ROBIS results for the systematic review by Papadimitriou 2019 et al.[1]

Phase 1: Assessing relevance	Phase 2: Identifying concerns with the review process				Phase 3: Judging risk of bias
Does the question addressed by the review match the target question?	Domain 1. Study eligibility criteria	Domain 2. Identification and selection of studies	Domain 3. Data collection and study appraisal	Domain 4. Synthesis and findings	Risk of bias in the review
Not applicable, because we did not formulate a target question		☹	☹		☹

☺ = low risk of bias; ☹ = high risk of bias

Table 4 Limitations of the systematic review by Papadimitriou 2019 et al.[1]

Item	Limitation
Pilot testing of research methods	Not reported whether research methods were pilot tested
Adverse effects of interventions	Adverse effects of interventions were not assessed
Registration or publication of the protocol	A protocol was not published nor registered a priori
Study selection and data extraction	High risk of selection bias, ie, almost 90% (249/279) of studies were excluded based on the screening of the title only
Reproducibility	The references of most excluded studies and their rationale was not given
Risk of bias assessment	In the one randomised controlled trial[17] included in this systematic review the authors assessed risk of bias with an outdated version of the Cochrane's risk of bias tool for randomised trials.[9] The risk of bias in the cross-sectional studies and cross-sectional studies was not assessed. Instead quality assessments of these studies were conducted with tools with crucial shortcomings.
The strength of evidence	The strength of evidence for each main outcome was not given
Risk of bias across studies	The authors did not report on selective reporting within studies

reference, numerous updates of this tool have been published and archived.[10,11] A more recent version of this RoB tool, for example, RoB 2, should have been consulted and implemented for this review. Further, risk of bias in the retrospective and cross-sectional studies was not assessed. Instead quality assessments of these studies were conducted with tools with crucial shortcomings, that is, the quality of the eligible retrospective studies was assessed with a non-validated tool[12] and the quality of the cross-sectional studies was assessed with the Newcastle Ottawa scale which has shown to give low reliability between reviewers and lacks good guidance manuals.[13,14,15] Seventh, the authors reported on the quality of individual studies, but did not give the strength of evidence for each main outcome, which is essential information for end-users of systematic reviews. Eight, the authors did not report on selective reporting within the eligible studies.

What are the implications and what should change now?

The eight limitations identified in this critical appraisal and the low to moderate quality evidence identified in the eligible studies jeopardise the trustworthiness of this review. These shortcomings should be carefully considered when translating the findings of this review into practice.

So what should change? Journals, editors, and peer reviewers have an important role as gatekeepers of research quality. These stakeholders can apply a variety of strategies to improve the quality of their journal articles. Strategies before the publication of a review include: 1) not accepting reviews whose protocols were not registered or published *a priori*; 2) appraising each submitted review with the PRISMA, AMSTAR 2, and ROBIS tools; and 3) assessing the reproducibility of the review. Strategies after the publication

of a review include: withdrawals, retractions, and corrections of reviews. Implementing these strategies by journals, editors, and peer reviewers will eventually reduce the overall research waste. Many stakeholders will benefit.

Data sharing

All raw data sheets of our critical appraisals with the PRISMA, AMSTAR 2, and ROBIS tools can be requested from the corresponding author (RMR) at reyndersmail@gmail.com. We will respond rapidly to further clarify any questions on our data and conclusions.

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