

Adult Patients' Motivations and Expectations of Orthodontic Treatment: A Systematic Review Protocol

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Protocol

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Abstract

Background: This is a protocol for a systematic review of the motivations and expectations of adult patients who seek orthodontic treatment. With the continuous improvement of orthodontic technique and rapid innovation of orthodontic appliances, more adults begin to consider orthodontic treatment. Appropriate motivations and realistic expectations play an important role towards a desired goal that are thought to increase patients' cooperation and achieve satisfaction with treatment outcome. This review aims to assess the motivations and expectations of adult patients who seek orthodontic treatment and investigate how their motivations and expectations affect their satisfaction with treatment outcomes.

Methods: A systematic search will be undertaken to map and screen the literature on adult patients' motivations and expectations of orthodontic treatment and their effects on satisfaction of treatment outcome. Papers written in English or Chinese with no study design restrictions will be included. The study of adolescent patients or patients' parents, patients with craniofacial hypoplasia and orthodontic treatment combined with orthognathic surgery will be excluded. If quantitative synthesis is possible, a meta-analysis will be conducted.

Discussion: This systematic review will identify and gather evidence on adult patients' motivations and expectations of orthodontic treatment. The method orthodontists obtain and assess adult patients' motivations and expectations will be discussed. Accurate obtaining and appropriate managing adult patients' motivations and expectations may increase the cooperation during treatment and satisfaction of the treatment outcome.

Systematic review registration: PROSPERO CRD42020185022

Background

The current available orthodontic techniques and continuously innovated orthodontic appliances, such as temporary anchorage devices (TADs), ceramic braces, lingual appliance and clear aligners, have not only increased efficiency but also reduced visibility of contemporary orthodontic treatment. Improved techniques coupled with modern marketing and advertising push more adults to consider orthodontic treatments(1). According to the practice surveys in 2015, there is a gradual increase in the number of adults demanding orthodontic treatments in the United States (2). As a similar trend is occurring worldwide, adult orthodontics has been a major component of orthodontic practice (3).

Adult patients' motivation for seeking orthodontic treatments may include the wish for aligned teeth, optimised facial appearance, better oral function, increased attractiveness, improved self-confidence and even enhanced social status(4-8) . However, lack of growth potential and poor oral conditions such as accompanied periodontal disease, caries, tooth abrasion, tooth loss and TMJ disorder have made the orthodontic treatments for adult patients more challenging and sometimes treatment regimens have been compromised. An interdisciplinary approach is often required because of the accumulating complexities of the ageing dentition present(9). Appropriate motivations and realistic expectations play an important

role in enhancing patients' compliance during treatment. Unfortunately, some adult patients may have unrealistic expectations on the orthodontic treatment outcomes (10). This is proposed to be due to patients' limited knowledge of predicted treatment outcomes or patients presenting with some psychological disorders, such as body dysmorphic disorder (11-13).

As a result of the adult patients' high motivation and potentially unrealistic expectations, patients and orthodontists may assess treatment outcomes differently. On the other hand, the clinical assessment of orthodontic treatment needs by the orthodontist, while assessing normative need may not necessarily reflect the patients' felt needs, their wishes and expectations of treatment outcome (14, 15). This may further affect the optimal delivery of patient centred care, as patients are not fully involved in their treatment plan. Therefore, there is a need to understand adult orthodontic patients' motivations and expectations in order to achieve satisfaction with the orthodontic treatment outcome.

The aim of this systematic review is to map and screen the available literature on the motivations and expectations of adult patients who seek orthodontic treatments and the effect of their motivations and expectations upon their satisfaction with treatment outcomes.

This proposed systematic review will answer the following two questions:

- 1) What is the current available evidence about the motivations and expectations of adult patients who seek orthodontic treatment?
- 2) How do patients' motivations and expectations affect their satisfaction with orthodontic treatment outcomes?

Methods

Study design

A systematic review and, if possible, a meta-analysis will be conducted to map and screen the literature on adult patients' motivations and expectations of orthodontic treatments and their effects on satisfaction of treatment outcome, following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (16).

Study Eligibility

Type of studies

Papers written in English or Chinese with no study design restrictions will be included. Review articles, experimental studies (randomized or non-randomized controlled trials, controlled before-after studies, prospective or retrospective cohort studies), case-control studies and cross-sectional studies and

qualitative explorations, that assessed motivations, expectations and satisfaction with orthodontic treatment outcome will be included.

Types of participants

The inclusion criteria are adult patients aged 18 years and above who seek orthodontic treatments. Orthodontic treatment uses different techniques, such as labial fix appliance, lingual appliance, clear aligner and removable appliance will be included. Adolescent patients 17 years and under, patients' parents and patients with craniofacial hypoplasia, such as cleft lip and palate, and patients who receive orthodontic treatment combined with orthognathic surgery will be excluded from the systematic review.

Outcome measures

The primary outcome is to identify the adult patients' motivations and expectations of orthodontic treatments. Motivation for treatment stems from several sources and can be defined as a concept that describes the conscious or unconscious stimulus for action toward a desired goal (4). Adult patients' treatment expectation can be defined by Thompson and Sunol as a kind of realistic and practical belief that something will happen actually during process or after the treatment completed(17). As there is no consensus on measures to assess treatment expectation/motivation, adult patients' treatment expectation and motivation can either be measured by surveys with a general question or a series of questions(4, 18, 19) or other measures(5) developed to assess expectation and motivation for orthodontic treatment. The instrument can be unipolar or bipolar scale. For example, continuous scale such as visual analogue scale (VAS) or five-point Likert scale.

The secondary outcome is mainly to investigate whether an association exists between adult patients' treatment expectation/motivation and satisfaction with treatment outcomes. To what extent patient's expectation/motivation affects their satisfaction with treatment outcomes. Again, there is no established systematic reviews to specifically explore this topic, we are therefore to look broadly to identify potential mechanism on the effect of patient's treatment expectation/motivation on their satisfaction with treatment.

Search strategy

The sources to be searched are online databases including MEDLINE via PubMed, Scopus, Embase, Cochrane, Web of Science, PsychINFO and Assia. The grey literature will be searched using Google Scholar and OpenGrey (www.opengrey.eu/). The literature written in Chinese will be searched by Cnki (<https://www.cnki.net>) and Wanfang (<https://www.wanfangdata.com.cn>) online databases. In addition, a manual search will be conducted based on the reference lists of the selected studies. The search dates are from the year 1969 to present. Literatures written in English or Chinese will be included.

The search will be developed using medical subject headings (MeSH) and text words related to adult, young adult, orthodontics, malocclusion, motivation and expectation. A draft MEDLINE via PubMed search strategy is included in additional file 1(see Additional file 1). After the MEDLINE strategy is completed, the draft search protocol will be used in the other databases listed. When the electronic

database search is finished, the references of the selected studies will be examined. Until the full search strategy is completed, a topic expert will be invited to check the list of the selected publications to identify any known studies that might have been missed. Software EndNote X9 will be used to manage the searched results.

Selection of studies

We will remove duplicates using EndNote’s duplicate identification tool, and then manually. At the first stage, all the title/abstract of records will be screened by YQ using Rayyan(20) (<http://rayyan.qcri.org>). Any studies that are not related to adult patients’ motivation and expectation will be excluded at this phase. At the second stage, the full text of records which match the selection criteria will be screened independently and in duplicate by YQ and SY, which will follow the exclusion criteria (see Additional file 2). If any discrepancies in the selection process occurs, it will be discussed first between the two peer reviewers. If the discrepancies will not be resolved after the discussion between the two reviewers, a third reviewer (RF) will be invited to discuss in detail and arbitrate to ensure a consensus is reached. Throughout the review, records and data will be managed according to the PRISMA protocol flow diagram(16). Included studies will be presented in a “Characteristics of included studies” table (Table 1), containing study reference, quality rating, sample and population characteristics, study design, measures, study characters, results and main findings.

Table 1
Characteristics of included studies

Study reference	Quality rating	Sample and population characteristics	Study design	Measures	Study characters	Results / main findings
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Data collection and management

Once the studies are selected for final analysis, data will be extraction by two reviewers independently and in duplicate using a standardised data collection form (see Additional file 3). Extraction information will include the tile, author, study population (number of participants, age, gender, ethnicity/race and baseline characteristics), study setting, intervention (types of orthodontic treatment, stage of treatment, types of interview and questionnaire), methodology (design of study, duration, recruitment, completion rates and data analysis) and outcomes. YQ and SY will examine the extracted data independently and if any objection or disagreement occurs, it will be resolved by consensus between them or calling the third reviewer (RF) to arbitrate. Any missing data will be requested from the study authors through emails.

Risk of bias assessment

The methods used to assess risk of bias will be conducted at the outcome and study level. At the study level selection bias such as ‘inappropriate sampling frame, exclusion criteria, observer bias’, and information bias such as missing data and variables will be assessed using the Joanna Briggs Institute for bias measurement for the selected study types.

At the outcome level, “motivations and expectations affect satisfaction with treatment outcome” will be assessed by reporting the level of reliability of the measures used to assess treatment satisfaction. In addition, GRADE will be used to assess the evidence at the outcome level as appropriate (21). The search of literature will be restricted to English-language and Chinese-language publications, which may introduce citation bias and jeopardize the evidence synthesis.

Quality assessment will be carried out using tools appropriate to study type. These will include AMSTAR 2 to assess systematic review quality (22); the Reporting of Observational Studies in Epidemiology (STROBE) for cohort, case–control and cross-sectional study quality (23). All eligible papers will be assessed independently by the reviewers using AMSTAR 2 or STROBE as appropriate.

Data synthesis

As the systematic review will consider both quantitative studies and qualitative studies that fulfil the inclusion criteria, for quantitative research meta-analysis will be conducted. Data will be extracted from each study and effect size will be assessed. The programme Comprehensive Meta-Analysis will be employed to assist with the conversion of the aggregate statistical details and entered into one of the 100 formats available to transform this information into effects sizes with weights. The z and standard error values will be copied into the STATA programme to produce editable ‘forest-plots’ and measures of heterogeneity, random overall effect sizes and meta-regression of moderators (e.g. year of publication and develop status of country from where study was conducted). Sensitivity analyses will be conducted to determine the robustness of the results and detect potential sources of bias.

For qualitative research articles, the data will be synthesised using thematic analysis(24) by identifying the important and prominent themes and the findings summarized accordingly. The following thematic headings may include: (1) study design; (2) quality of evidence; (2) Study Population (Number of participants/ Age/ Gender/ Country Ethnicity); (3) Study Setting; (4) Intervention (Types of orthodontic treatment/Stages of treatment/Types of interview/Time of interview/Questionnaire). NVivo software will be employed to organize, analyse and find insights in qualitative data. The data will be synthesised and presented in a narrative form.

Statistical analysis

If quantitative synthesis is possible, a meta-analysis will be conducted. Data will be extracted from each study and effect size will be assessed. Associations will include Pearson's and Spearman's correlation coefficient. Means and sample size of low/high value groups, odds ratio and sample size, beta coefficient and raw regression coefficient with standard error. A number of visual presentations from the analysis will be conducted including forest and funnel plots and meta-regression graphs. The heterogeneity statistics Q and I squared will also be reported and interpreted. A random error analysis will be appropriate for this study. Publication bias will be inspected through the conventional ‘File Drawer’ statistics in addition to the funnel plots.

Quality of evidence

Grading of Recommendations Assessment, Development and Evaluation (GRADE) framework will be used to evaluate the quantitative data for quality of evidence. PRISMA-P of the protocol checklist was provided in the additional file (see Additional file 4).

Discussion

This systematic review will identify and gather evidence on adult patients' motivations and expectations of orthodontic treatment. The methods used to assess adult patients' motivations and expectations will be described and discussed. Accurate obtaining and appropriate managing adult patients' motivations and expectations may increase the cooperation during treatment and satisfaction of the treatment outcome.

Patients' motivation and expectation is reported to have significant impact on their satisfaction with treatment outcomes. With the increasing number of adult patients seeking orthodontic treatments for functional and aesthetic reasons, it is important to ensure patients have realistic motivation and expectations on their treatment outcomes. The findings of this systematic review will contribute to the evidence and provide meaningful implications for orthodontic practice and treatment outcomes. In addition, the results will inform us in delivering better patient-centred care by involving closely with patients in their treatment planning and shared decision making.

This protocol was developed in accordance with the PRISMA-P statement (see Additional file 4).

Abbreviations

GRADE

Grading of Recommendations Assessment, Development and Evaluation;

MeSH

Medical subject headings;

PRISMA

Preferred Reporting Items for Systematic Reviews and Meta-Analyses;

PROSPERO

International Prospective Register of Systematic Reviews.

Declarations

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Availability of data and materials

Data can be obtained by contacting the corresponding author.

Authors' contributions

YQ is the guarantor of the review. YQ, SY and RF framed the research question and developed a study design. GH gave advice to conduct data synthesis and statistical analysis. All authors reviewed and approved the final report.

Competing interests

The authors declare that they have no competing interests.

Consent for publication

Not applicable.

Ethics approval and consent to participate

Not applicable.

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Department of Orthodontics, Affiliated Stomatological Hospital of Nanjing Medical University (NMU) is the Sponsor, meaning it has overall control of the data. The NMU is not involved in any other aspect of the project.

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