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Patient education in dental medicine: A review of the literature

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Abstract

Introduction: In dental medicine, chronic diseases and chronic conditions (such as chronic periodontitis, temporomandibular disorders, chronic orofacial pain) justify patient education to self-care. This strategy of secondary or tertiary prevention, even if officially recognised, is still less known compared to health education, a form of primary prevention. The aim of the study was to make the point of recent studies devoted to patient education. Thus, the purpose of the study was to give an updated picture of patient education in odontology, describing, through an analysis of the international literature from 2006 to 2016, its characteristics and development.

Methods: The main databases selected were: PubMed, EMBASE, CINAHL, Web of Sciences, DOSS, 302 articles published between 2006 and 2016 on patient education among which four RCTs and a case study were analysed because of their rigorous scientific quality.

Results: Patient education concerns chronic diseases and conditions also in the field of orthodontics. This limited number of studies, showed that patient education in odontology can bring real bio-clinic, cognitive, psychological and economic benefits to patients. Overall, it allows patients to better understand their illness and treatment and, thus, to improve their health behaviours and self-care techniques, which would reduce the treatment costs. Educational interventions in odontology should constitute a component of patient education in several chronic systemic diseases such as diabetes. It would be necessary to train future practitioners in this field and to develop a scientific research on this practice.

KEYWORDS

dental education, dental medicine, patient education, review of literature

1 | INTRODUCTION

There is no longer any doubt about the fact that the acquisition and maintenance of self-care behaviours such as oral hygiene, may delay the onset of orofacial diseases (primary prevention) or decrease and slow down their effects when they become chronic (secondary and tertiary prevention).¹ In the first case, interventions concern the field of health education, while in the second, they consist of patient education actions and/or programmes. Patient education actions can be short (one session,

for example), while the programmes are made up of several sessions over time.²

However, while the literature on the policies, the strategies and the effects of primary prevention (health education) is very abundant, there are far fewer studies on the education of patients with chronic dental and oral cavity diseases.³

This may seem surprising considering the prodigious development of self-management programmes in almost all long-term diseases. Thus, in a previous bibliometric study we showed that, over the period 2004-2014, 30 669 articles on patient education in chronic diseases had been gathered by PubMed, including 13 109 literature reviews, 5977 randomized control trials (RCT) and 397 meta-analyses.⁴

[Correction added on 28 January 2019, after first online publication: the first author's name has been added to the 'How to cite this article' section.]

The legitimacy of this practice has been highlighted by numerous researches and recommendations from scientific societies,^{5,6} and the WHO gave, in 1998, the following definition of therapeutic patient education:

therapeutic patient education should enable patients to acquire and maintain abilities that allow them to optimally manage their lives with their disease. It is therefore a continuous process, integrated in health care. It is patient-centred. It includes organized awareness, information, self care learning and psychosocial support regarding the disease, prescribed treatment, care, hospital and other health care settings, organizational information and behaviour related to health and illness. It is designed to help patients and their families understand the disease and the treatment, cooperate with health care providers, live healthy, and maintain or improve their quality of life.⁷

Nevertheless, the name and concept of patient education do not seem to be unknown by the professionals in charge of oral health, especially by dental hygienists. Mann and Sellers⁸ published, in 2003, a national survey of 255 accredited dental hygiene training programmes in the United States, which showed that the majority of curricula (71%) gave specific instruction on patient education techniques and 94.8% offered opportunities for students to practice these techniques (*"in 2000 the majority of dental hygiene programs offered patient education units in their curriculum and required practice opportunities for students before their initial clinical experience"*). The authors conclude: *"programs that do not currently focus on the patient's education may wish to review their curricula (...) dental hygienists must be well-prepared to teach their clients self-care techniques."* It should be noted that the methodology of patient education in odontology is taught to hygienists in countries where this profession exists officially.

Knowing that chronic diseases and chronic conditions exist in dental medicine (eg, periodontitis, temporomandibular disorders, chronic orofacial pain), and that this justifies the patient's training in self-care, consisting in patient education, a recognised concept and practice, we wanted to make the point on the recent studies devoted to this subject. Thus, the purpose of our study was to analyse the studies specifically dealing with patient education in odontology, putting into evidence their main characteristics and the development of this practice as described in the international literature from 2006 to 2016.

2 | METHODS

Studies were selected in a first search strategy from the following databases: PubMed, EMBASE, CINAHL and Web of Sciences, using the following keywords: patient education, therapeutic patient education, self-care, self-management, intervention, programme, dentistry, dental care, dental health, oral health, tooth, teeth and periodontitis.

With this first search strategy, 2928 studies were obtained, but the great majority dealt with health education interventions rather than with patient education.

Therefore, to focus on "patient education" a further strategy was used, interrogating only PubMed with the filter *journal categories*: dental journals and DOSS, including the same keywords. DOSS, as a database specifically dedicated to research in Dentistry and Oral Sciences Sources,⁹ seemed to be more relevant to our review's strategy.

Being the term "therapeutic patient education"⁷ mainly used by European researchers and therefore less cited than "patient education" in international scientific articles, the latter was used as keyword. The keyword "self-management program" has been taken into account because commonly found in the American literature instead of "patient education." The keyword "program" has been added because the analysis of structured and organised patient education activities was preferred rather the informal interventions. The search strategy used with PubMed was the following: ("patient education"[TIAB] OR "patient education"[OT] OR "therapeutic education"[TIAB] OR "therapeutic education"[OT]) AND ("dentistry"[MH] OR "dentistry"[TIAB] OR "dentistry"[OT] OR "Dental Care"[TIAB] OR "Dental Care"[OT] OR "Dental Health"[TIAB] OR "Dental Health"[OT] OR "Oral Medicine"[TIAB] OR "Oral Medicine"[OT] OR "oral health"[TIAB] OR "oral health"[OT] OR "Endodontics"[TIAB] OR "Endodontics"[OT] OR "Orthodontics"[TIAB] OR "Orthodontics"[OT] OR "Periodontics"[TIAB] OR "Periodontics"[OT] OR "tooth"[TIAB] OR "tooth"[OT]).

A total of 325 articles were obtained.

Finally, after eliminating duplicate studies (7%) of the total number of studies, 302 articles were identified, published from 2006 to 2016. Studies which did not meet the following criteria were excluded:

- Published before 2006,
- Written in other language than English or French,
- Focusing on treatment and follow-up strategies, and/or counselling techniques or recommendations rather than on patient education.

Four RCT, one case study and three reviews on 302 (2.64%), were selected which are really relevant to patient education and which analyse or describe structured patient education activities or programmes, rather than informal interventions or simple transmission of information or counselling. Among the eight articles, finally 5¹⁰⁻¹⁴ were selected because of their high scientific criteria: four RCTs and a single case study,¹² specifically related to PE programmes as *main* mode of intervention and addressed to patients with oral/dental chronic condition (Figure 1).

Three reviews of literature¹⁵⁻¹⁷ and other studies¹⁸⁻²⁰ have been considered just for the discussion.

Three authors (GL, MGA and JFI) independently reviewed each of the five studies (four RCT and one case studies) and collected the data, filling in a grid, named PERC (Patient Education Research Characteristics) already used in other previous studies.²¹⁻²⁴

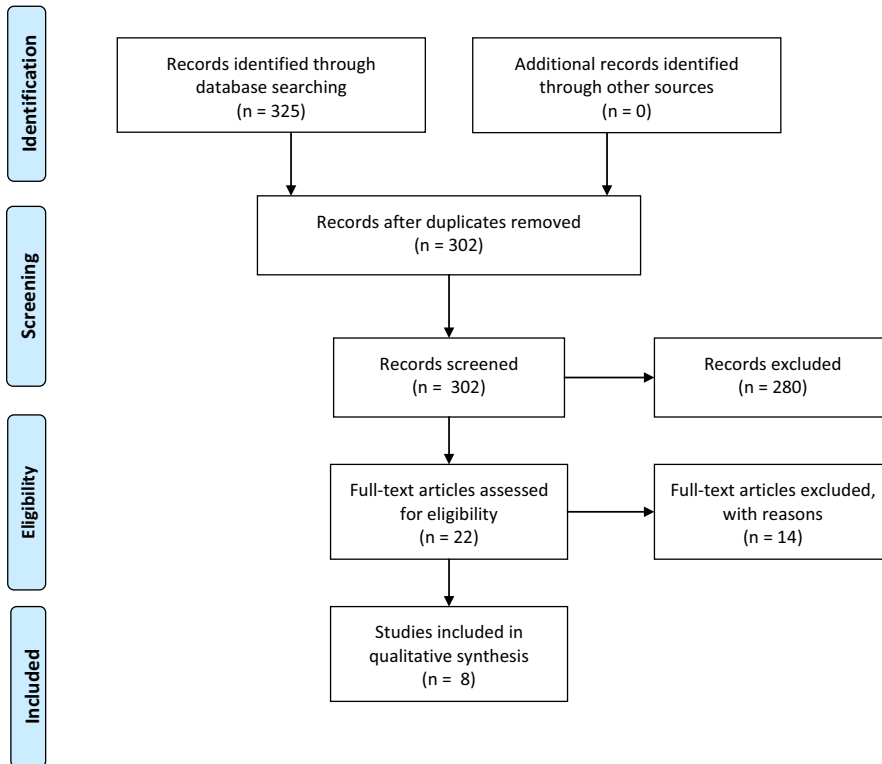


FIGURE 1 PRISMA flow diagram. From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Med.* 2009;6(7):e1000097. <https://doi.org/10.1371/journal.pmed1000097> [Colour figure can be viewed at [wileyonlinelibrary.com](https://doi.org/10.1371/journal.pmed1000097)] [Colour figure can be viewed at [wileyonlinelibrary.com](https://doi.org/10.1371/journal.pmed1000097)]

This checklist, named by the authors PERC (patient education research characteristics) considers: the authors' country, the type of study (ie, evaluation study, randomised control trial, review, meta-analysis, description), the research duration, the patients' characteristics (ie, age, minorities), the type of disease, the categories of educators (ie, doctors, nurses), the context of education (ie, hospital, primary health care, pharmacy, community), the educational strategies (ie, group, individual, Web) and the evaluation criteria (ie, bioclinical, educational, psychosocial, economic).

3 | RESULTS

3.1 | Journals

The five articles have been published in five scientific journals, all in the field of oral health: one in *The Journal of Orthodontics and Dentofacial Orthopedics*, one in *The Journal of Clinical Periodontology*, one in *The Journal of Clinical Oral Investigation*, one in *The Journal of Dental Hygiene* and one in *The Journal of the American Dental Association*. The research teams originate from United Kingdom,¹⁰ Belgium,¹¹ Italy,¹⁴ Sweden¹² and China.¹³

3.2 | Types of study

The types and objectives of the studies, the research design and duration, the number, gender and characteristics of the patients are illustrated in Table 1.

The four randomized control trials (RCT) are comparative studies dedicated to:

- Orthodontic treatment^{10,13}
- Periodontitis¹¹
- Myofascial pain¹⁴

The single case study is devoted to periodontitis.¹²

Three studies^{11,13,14} lasted from 1 to 4 months and two studies^{10,12} two years.

3.3 | Objectives

The analysis of the main purpose of each article shows that the five studies¹⁰⁻¹⁴ intended to demonstrate the effectiveness of patient education: four studies^{10,11,13,14} show the efficacy on the short-term and 1¹² on the long-term (more than one year).

3.4 | Patients

A total of 265 patients were included in this research. Five studies¹⁰⁻¹⁴ concerned adult patients, one study¹¹ also considered elderly patients (23.7%). The great majority were women (172 = 64.9%); the men were 93 (35%); the sex ratio was: 0.54.

Their median age was 43 years (range between 13 and 55 years); their educational level was given just in one study¹¹ mentioning the patient's low health literacy.

The content, duration and settings of the patient education programmes, the educators, the educational strategies,

the evaluation criteria and measurements, are presented in Table 2.

3.5 | Settings of TPE

The recruitment of patients and their education took place in the Hospital^{10,14} or in dental clinics.^{11,12}

3.6 | Educational strategies

One article specifies that patient education was delivered with computer-assisted instruction in 3D video format.¹¹ Two studies mention that patient education was delivered through the Web social media: YouTube¹⁰ and Webchat.¹³ Face to face education was implemented in one study,¹² using motivational interviewing techniques, the practice of manual dexterity and a short structured diary.

3.7 | Content and duration of the programmes

The following topics are taught in the patient education programmes: basic knowledge on the disease and on the treatment, that is, oral hygiene,^{10,11,13} dietary rules,^{10,13} self-care techniques,¹²⁻¹⁴ coping with a new appliance of breakages¹⁰ and decision in case of crisis (emergency appointment).¹²

In one study dealing with patient education in myofascial chronic pain,¹⁴ the following aspects have been taught to the patients: aetiological factors, jaw muscle function, how to keep relaxed, relation between chronic pain and psycho social distress.

Two studies among 5^{10,11} have specified the number of sessions and have defined the duration of the patient education programmes. The number of sessions (video watching) varies from 2 to 12, each of them lasting six minutes; the duration of the patient education programmes varies from 2 to 12 weeks.

3.8 | Educators

Three studies indicate the categories of healthcare providers participating in education: dentists,¹⁴ dental assistant,¹¹ dental hygienist and psychologist.¹²

3.9 | Outcomes of patient education for patients with chronic oral problems

All studies give arguments for the effectiveness of the patient education programmes classified according to bioclinical, educational, economical and psychosocial criteria (Table 3). The follow-up period lasted for: 2 weeks,¹¹ 6 weeks¹⁰; 3, 12 and 24 months.¹²

4 | DISCUSSION

The first observation that can be made concerns the low number of publications on patient education in odontology. Although

our search strategy was based on the terms that refer to patient education in the international literature, we found only 302 articles that really deal with this topic. Even fewer studies are RCTs. The competence of educating is clearly part of the more general communication skills advocated by the General Dental Council for the future dentists, the dental therapists, the dental hygienists and the dental nurses (GDC, preparing for practice, dental team learning outcomes for registration (2015 revised edition)). The importance of this competence is also underlined by the European Association of Dentists in the «profile and competences of the future European dentist» published in 2009 (Eur J Dent Educ. 2010 Nov; 14 (4):193-202). We interpret this rather as a quite widespread confusion in odontology between health education and patient education. On the other hand, when one queries the databases with the keywords: "odontology" and "health education" an overabundance of publications (about 6700 articles with PubMed) is provided, probably due to the considerable attention brought by the dentist on the prevention of caries and periodontal diseases in young and adult people. However, while these two forms of education are strategies of prevention, it is not about the same type of prevention. Health education is a form of primary prevention, while patient education/therapeutic patient education is a secondary and tertiary prevention, as WHO pointed out.⁷ Similarly, patient education/therapeutic patient education, as the name implies, addresses exclusively to patients, people already suffering from oral diseases, whose course must be slowed down and/or whose complications must be avoided. The targets of these two forms of education are therefore different, even though the objectives would in many cases be identical when, for example, it is about improving oral hygiene by a better use of the technique of teeth brushing or of cleaning inter-dental spaces.

The differences will concern:

- Clinical situations which do not fall into the general framework of oral dental prevention rather focused on carious disease: this is the case of chronic orofacial pain¹⁵ periodontitis, temporomandibular disorders.^{16,17}
- Systemic chronic diseases, such as diabetes, in which part of the patient education programme should be related to oral health.¹⁸ It is also the case of patient education in all the chronic pathologies which re-emerge on the orofacial sphere.
- Patient education can also be applied to the field of orthodontics, where it has been demonstrated that a better understanding by the patient of the treatment can avoid bracket bond failure and reduce its duration, with economic consequences.¹³

Patient education is also distinguished from health education:

- By the age of the patients, more often adult,
- By their learning needs, in particular those patients with low health literacy,¹⁹ requiring the acquisition of more in-depth knowledge of the disease, because it conditions the subsequent observance,

TABLE 1 Types of study, objectives, patients

Publication	Type of study	Research design	Research duration (wk)	Objectives	No. patients intervention group
Al-Siwadi FM et al, 2014	Comparative study: 2 cohorts; prospective parallel group RCT	Quantitative study with questionnaire	2 y + 3 mo	To assess whether provision of audio-visual information on YouTube to orthodontic patients undergoing fixed appliance treatment results in improved knowledge when compared with conventional methods of information provision.	30
Cleeren G et al, 2014	Comparative study: 2 cohorts; RCT	Qualitative and quantitative study with questionnaires + Focus group	3 mo + 2 wk	To investigate the effect of 3D animation on the increase and recall of knowledge on periodontitis by patients with periodontitis	34
Jonsson B et al, 2009	Two experimental single case studies with multiple baseline design	Single case study	2 y	To describe and evaluate an individually tailored treatment programme based on a behavioural medicine approach to oral hygiene self-care for patients with chronic periodontitis	2
Li X et al, 2016	Comparative study 2 cohorts; RCT	Quantitative study + WeChat	2 y + 8 mo	To determine the effectiveness of a messaging app in improving patients compliance and reducing the duration of orthodontic treatment	112
Michelotti A. et al, 2012	Comparative study: 2 cohorts; RCT	Quantitative study	3 mo	To compare the effectiveness of an educational programme with that of an occlusal splint in treating myofascial pain of the jaw muscles across a short period	23

- By the psychological profile of the patients, who have often been neglecting oral hygiene for years, as in the case of periodontitis, and who must understand the need for them to radically change their habits. These patients must also often be re-motivated.¹²
- By the educational strategies:

- o Patient education is necessarily based on a screening assessment (also known as Educational Diagnosis² of the patient's previous knowledge,¹² lifestyle and learning needs.

Thus, it is an individualised education, even if groups of patients can be gathered. A variety of educational techniques are used: leaflets,¹⁰ websites for the diffusion of videos¹⁰ or mobile messaging¹³ or computer programs featuring 3D animation.¹¹ It can be organised into programmes including several education sequences coupled with the treatment sessions,¹⁴ depending on the number of objectives to be achieved by the patients. To reinforce compliance, patient education can mobilise specific maintenance techniques such as motivational interviewing.¹² Finally, unlike health education, patient education does not use information campaigns for a wide audience, broadcasted on various media.

In this literature review, randomized control trials were considered as providing scientifically convincing results. They show real benefits for patients. These benefits are bioclinical, such as the reduction of the "index plaque" or the "gingival index".^{12,13} The shortening observed in the duration of the treatment (DOT) and the decrease in brackets bond failure¹³ are also significant results in orthodontics. In myofascial problems, patient education results in reduction of masticatory pain and headache as well as in a better health status.¹⁴

Moreover, other very important results deriving from patient education concern an improvement in the self-care behaviours,^{12,13,20} at the origin of which we find the acquisition of knowledge on the disease¹⁰⁻¹² and the treatment^{11,13} by patients, a better technique and dexterity of oral hygiene¹² and a better coping.¹⁵ An improved communication between patients and HCP after education is also reported.¹⁴ Positive effects in terms of cost effectiveness are highlighted in two studies.^{12,13} However, the positive effects of these educational interventions are only measured in the short and medium term (six weeks) not longer than two years.¹²

Total no. patients	Patients' characteristics				Chronic conditions	Conclusions
	Age	Female %	Male %	Ratio F/M		
60	Young/Adults, median age 15.5	66,7%	33,3%	2/1	Patients who just had fixed orthodontic appliances.	Presenting audio-visual information through the YouTube site to orthodontic patients resulted in significant improvement in patients' knowledge related to care of the dentition and the appliances when compared with standard methods of providing information. Supplementation of verbal and written patient information with audio-visual information via internet is therefore worthy of consideration.
68	Adults- median age 54.4 ± 10.3	56,7%	43,3%	1/1	Periodontal patients	3D animations are more effective than real time drawings for periodontal patient's education in terms of knowledge recall. 3D animations may be a powerful tool for assisting in the information process.
2	Adults	1 F	1	1/1	Patients with chronic periodontitis	The individual tailored treatment seems efficacious and useful to improve long-term adherence to oral hygiene in periodontal treatment. This model could be used as method for tailoring interventions targeted to oral hygiene for patients with chronic periodontitis.
224	Adolescents and adults. Mean age: 17.6 ± 5.7	69,6%	30,4%	2/1	Patients with orthodontic problems	The intervention with WeChat is effective in reducing the treatment duration and bracket bond failure, and improving the attendance in orthodontic patients.
44	Adults median age: 31.2	19 F	4 M	4/1	Patients with temporomandibular disorders (TMD) and orofacial pain	After a short period, changes in spontaneous muscle pain differ significantly between the education and the occlusal splint group. Pain-free mouth opening, headache and pain during chewing were not significantly different between the two treatments. For successful management of myofascial pain, education regarding self-care may be more effective than an occlusal appliance.

As observed in previous reviews on patient education in diabetology,²¹ and in cardiology,²⁴ a lack of a specific description of the programmes is obvious. The educational objectives of the patient education programmes were rarely specified, the educational diagnosis with the evaluation of the patient's previous knowledge on his disease is mentioned just in one study,¹² although awareness of its usefulness to tailor the educational intervention on the person's real needs.

This lack of description, including the one concerning the educational techniques¹⁴ makes the reproducibility of the experiences and the appropriation of the educational programme by others difficult.

4.1 | Limitations

Three main limitations of this review should be considered:

1. Even if a larger number of studies could have been obtained questioning the databases with other keywords as, for example: "patient instruction," "patient information,"

"patient counselling," these terms were discarded because they do not fit with the concept of "patient education";

2. The study takes into account the articles published in the 10 last years and this can constitute a limitation. Similarly, these analyses were restricted to the studies published in English and French in journals referenced in major databases, while an important grey literature may exist in this field;
3. The benefits of patient education have been underlined, despite the limited number of the considered studies.

5 | CONCLUSION

The review of the recent international literature on patient education in odontology puts into evidence the limited number of publications on this topic, particularly of RCTs, despite the need to use patient education as a strategy of secondary and tertiary prevention in several chronic oral diseases and conditions. It has been shown,

TABLE 2 Content, educational strategies, duration, educators, place of education, evaluation criteria and measurements

Publication	Content of the programme	Educational strategies	Duration of the programme	Educators	Place of education	Evaluation criteria (no.)	Evaluation measurements
Al-Siwadi FM et al, 2014	Coping with a newly fixed appliance, eating and drinking, oral hygiene, retention, appliance breakages, emergency appointments	(3 email at biweekly intervals asking to watch) You tube video, information leaflets	6 wk (each video was watched 3 times on average)	Clinicians	Hospital/ Clinic	Pedagogical criteria: questionnaire	Questionnaires (knowledge)
Cleeren G et al, 2014	Periodontal anatomy, causes, symptoms, development and treatment of the disease.	Videos on computer screen	2 wk	Dental assistant	Dental practice	Pedagogical criteria: questionnaire	Questionnaires (knowledge)
Jonsson B et al, 2009	Knowledge on periodontal disease, self-care interventions, individual goals on oral hygiene, continuous self-monitoring, practice of oral hygiene with aids	Instruction sessions (practice of manual dexterity), action plan for oral self-care, discussion on the diary	3 wk	Dental hygienist, Psychologist (supervisor)	Hospital/ Clinic	Bioclinical criteria: periodontal measures Educational criteria: oral health behaviour	Questionnaire (oral hygiene habits) Inspection of the index for vestibular/lingual surfaces and inter- proximal surfaces
Li X et al, 2016	Brush teeth in the right way, eating to avoid bracket loss, how to alleviate orthodontic pain, why is floss necessary, why a power brush is needed, what if I don't follow the instructions of my dentist	Not specified + Link to an article on a mobile web page + remind for attendance and behaviour change	variable	Nurse + app	Hospital + telephone	Bioclinical criteria: duration of TT, failed attendance, late attendance and bracket bond failure, orthodontic plaque index, modified gingivitis index	Interviews
Michelotti A. et al, 2012	Aetiology and prognosis for TMD, self-care for the jaw musculature (relax), use of the sp + home. Splint + program	Interactive interactive inter-views + visual aids	3 mo	Clinician	Clinic	Bioclinical criteria: pain. Pain-free maximal mouth opening, headache	Chewing (100 mm horizontal VASs), mouth opening (maximal)

TABLE 3 Outcomes of patient education programmes for patients with chronic oral problems

Bioclinical criteria	
Adherence to treatment	17
Oral hygiene behaviour orthodontic plaque index (OPI)	16, 17
Modified orthodontic plaque Index	17
Bracket bond failure	17
Plaque index	16,17
Gingival index	16,17
Mouth opening	18
Spontaneous muscle pain	18
Pain during chewing	18
Headache	18
Educational criteria	
Symptoms monitoring	15
Manual dexterity	16
Knowledge of the diseases/condition	14, 15,16
Knowledge of treatment	15,17
Better communication with healthcare provider	18
Self-care/self-management	16, 17
Attendance to sessions	15, 17
DOT (period of orthodontic treatment)	17
Psychosocial criteria	
Coping	14
Economical criteria	
Cost effectiveness	16, 17

through the analysis of a limited number of studies, that patient education can bring real benefits to the patients at both the bio-clinical and psycho-cognitive levels: overall, it allows them to better understand their disease and their treatment and to improve their self-care behaviour. Already recognised by several international odontology societies, the specific teaching methodology of patient education, different from the one used in health education interventions, should be better taught to future professionals in dentistry. Similarly, more research using a rigorous scientific methodology should be devoted to patient education in the future.

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