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Perceptions of interprofessional collaboration in education of dentists and dental hygienists and the impact on dental practice in the Netherlands: A qualitative study

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Abstract

Introduction: The purpose of this study was to evaluate the perceptions of dentists and dental hygienists regarding their own and each other's roles in interprofessional collaboration following a clinical interprofessional educational programme (CIEP) as part of their graduate programme at Radboud university medical center (Radboudumc) and HAN University of Applied Sciences (HAN UAS), Nijmegen, the Netherlands, respectively. Perceptions were obtained at the end of their study (2014) and two years after their graduation (2016).

Methods: A qualitative study was conducted using a questionnaire with open-ended questions. Sixty-two dentists and thirty-eight dental hygienists were invited. Theory-based analyses were applied in combination with principles of Grounded Theory to analyse and synthesise the collected data from the open-ended questions.

Results: At baseline, 100% responded. At follow-up, thirty-two dentists (51.6%) and twenty-six dental hygienists (68.4%) responded; twenty-seven dentists (43.5%) and eighteen dental hygienists (47.4%) were included. Many similarities were found between baseline and follow-up regarding perceptions of each other's expertise and responsibility, learning from and with each other, and the behaviour of students and the "novice" professionals in interprofessional collaboration. Both dentists and dental hygienists experienced the CIEP as useful for interprofessional collaboration. The "novice" dentists and dental hygienists indicated that in dental practices interprofessional collaboration was less common.

Conclusion: The CIEP resulted in more understanding amongst dentists and dental hygienists with regard to interprofessional roles, but in practice the "novice" dentists and dental hygienists face difficulties in applying the interprofessional roles.

KEYWORDS

collaboration, dental hygienists, dentists, education, interprofessional education

1 | INTRODUCTION

Demographic and economic developments require that the current healthcare workforce adapts to meet present and future challenges.[1,2] These challenges to healthcare also have an impact on the organisation of oral healthcare. In a patient-centred holistic approach, oral health is integral to general health, which makes it necessary to include oral healthcare teams in overall healthcare planning.

In the Netherlands, oral healthcare teams are made up of oral healthcare professionals, who include dentists and dental hygienists. For these teams to work effectively, it is important for members to recognise, respect and draw upon the strengths of each of the disciplines that make up the team. However, there seems to be limited understanding by team members of each other's roles.[3-5] The role of the dentist is generally understood, but internationally understanding of the role of the dental hygienist is limited.[3,5-9] This results in ineffective and inefficient interprofessional collaboration.[7,8] To overcome this situation, interprofessional collaboration skills can be taught. The World Health Organization (WHO) defines interprofessional education (IPE) as "when two or more professionals learn about, from, and with each other to enable collaboration and improve health outcomes".[9]

Accommodating changes in oral healthcare, dental treatments and wishes of the individual client requires a complex multiskilled oral healthcare team.[10,11] Task redistribution and interprofessional collaboration add to the delivery of good quality, (cost) effective, efficient, accessible, comfortable and person-oriented healthcare.[12,13]

Together with changes in content, legislation and policies, the scope of dental hygiene practice continues to develop.[14,15] In the Netherlands, changes in legislation and regulations brought about in 2006 have resulted in an ongoing debate about the redistribution of tasks in the dental profession. Since 2006, Dutch dental hygienists have been allowed to perform more caries-related diagnostic and treatment tasks.[16] As a result, relevant differences in the scope of practice amongst dental hygienists in the Netherlands and those in other countries have arisen from educational and regulatory differences.[17] These tasks are the so-called reserved procedures, which require a specific assignment from the dentist. In contrast to the situation in the Netherlands, dental hygienists in other countries are not allowed to perform preparations by "drilling" (they place and finish restorations).[17] Tasks not needing an assignment from a dentist in the field of prevention and periodontology, the so-called non-reserved procedures are similar in the Netherlands to those in other countries.[17] In the Netherlands, the redistribution of tasks offers a more autonomous role for dental hygienists, which gives them an area of expertise, professional autonomy, self-organisation and legal recognition.[11] Currently there is a substantial overlap in the tasks of dentists and dental hygienists (Figure 1). Based on experiences with the substitution in the field of nurse practitioners and physician assistants (who are performing medical procedures traditionally carried out by doctors), we expect that, due to the more effective and efficient use of everyone's competences, this overlap will decrease.[18]

Another major change in the intended collaboration is that dental hygienist and dentist will work alongside each other, instead of the more hierarchical collaboration of the past. This requires new interprofessional collaboration skills. Despite this, a 2010 study found marked differences in Dutch dentists' willingness to delegate dental tasks.[16] A possible explanation for the unwillingness to redistribute tasks might be lack of knowledge about and insight into professional roles of the dental hygienists in interprofessional collaboration.

Interprofessional education prepares the future professional for the efficient use of the right care, where everyone's roles and responsibilities are utilised to improve health outcomes (Figure 1). To stimulate interprofessional collaboration between dentists and dental hygienists in oral healthcare, Radboud university medical center (Radboudumc) and HAN University of Applied Sciences (HAN UAS) together developed a clinical interprofessional education programme

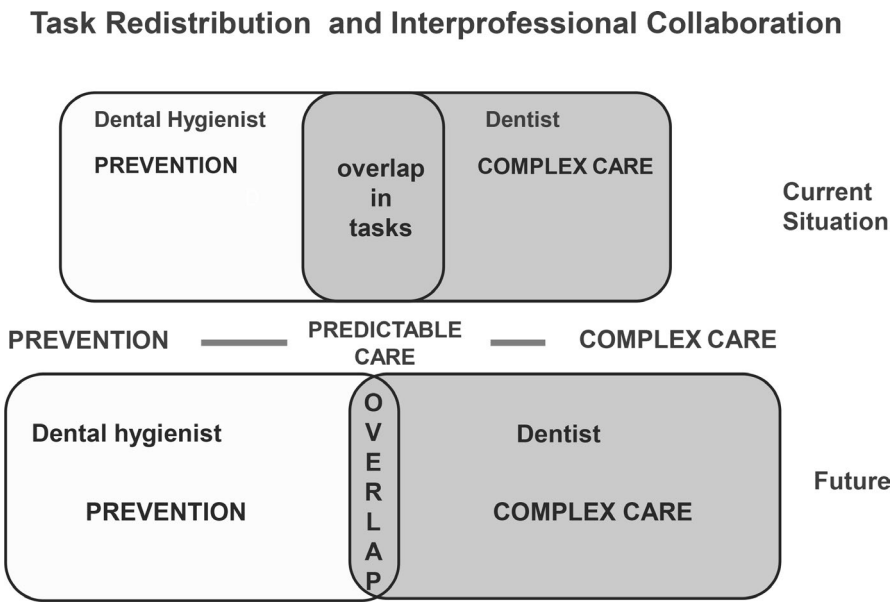

FIGURE 1 Task redistribution and interprofessional collaboration in the current situation and in future

(CIEP) for oral care students as a part of their graduate programme. The CIEP was designed on a common-sense basis, without theoretical grounds regarding mutual respect and professional roles. Dental and dental hygiene students in the final year of their professional education programme are jointly educated in the CIEP, where they work for one day of each week as an oral healthcare team in a clinical practice. Each clinical practice starts with a tutor meeting to prepare for the clinical practice. Dentists and dental hygienists work together and are in dialogue with each other to deliver effective and efficient oral care for every patient. They are jointly responsible for the patient care and supervised by lecturers, who are professionals themselves. The purpose of this study was to investigate how the CIEP influenced the role perceptions of dental and dental hygiene students in interprofessional collaboration in oral healthcare just before and two years after their graduation.

2 | METHODS

According to the Research Ethics Committee of the Radboud university medical center, Nijmegen, the Netherlands, this study does not fall within the remit of the Medical Research Involving Human Subjects Act (WMO) and can be carried out in the Netherlands without ethical approval from an ethics committee (2018-4772). The research used a qualitative prospective cohort study design and was conducted at the College of Dental Science at Radboudumc and the Dental Hygiene Program at HAN UAS in Nijmegen in the Netherlands. Baseline data retrieved from all (sixty-two dental and thirty-eight dental hygiene) students participating in the CIEP for four months were collected in 2014. Students were distributed over five teams with approximately twelve dental and eight dental hygiene students each. Follow-up data were collected from the same participants in 2016, by which time they had graduated and had worked as "novice" dentists and dental hygienists in dental practices for approximately two years. However, only dentists or dental hygienists who were employed under Dutch legislation were included (Figure 2).

The study was based on open-ended questions with topics related to IPE (Table 1). The open-ended questions were first tested for clarity and face validity. A lecturer in dental hygiene education and two graduated students who had attended this course in 2013 were asked to assess the open-ended questions independently, and the questions were adjusted in accordance with their feedback. The questionnaire comprised eight open-ended questions, including two questions related to: (a) own expertise and that of the other

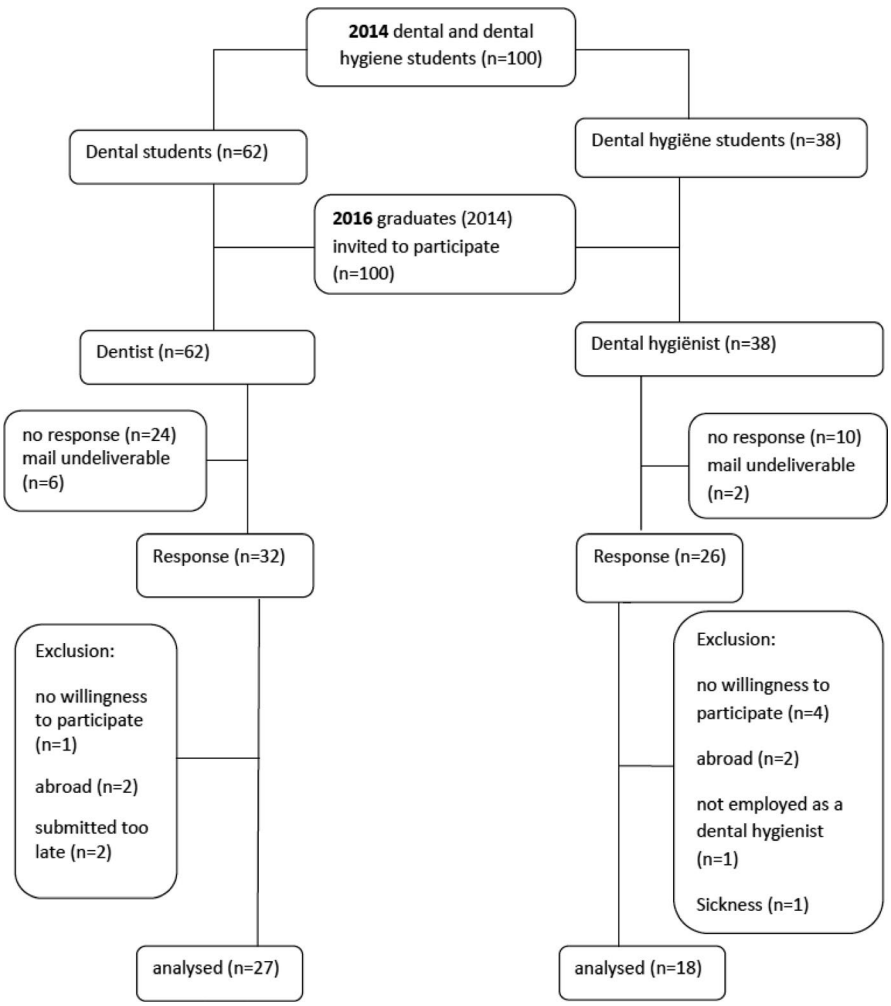

FIGURE 2 Flowchart study population in 2014 and 2016

professional in the dental care team; (b) responsibilities in patient care; (c) learning opportunities; and (d) supportive behaviour in collaboration. Gender and age were also recorded.

In January 2014, all CIEP students received the open-ended questions as a homework assignment by email and attended a short instruction meeting in which the questionnaire was explained. Participants gave informed consent by returning the questionnaire.

Two years after graduation, an email was sent to the participants with a questionnaire that contained twenty questions: the same open-ended questions as at baseline and an additional ten questions. Of these new questions, five were open-ended questions about: preparation for collaboration (n = 1), changes in perceptions with respect to education (n = 1), the proposed changes of the law (n = 1) and the influence of the working environment on interprofessional collaboration (n = 2). The other five questions were closed questions related to the characteristics of the graduation year, participation in the research (2014), whether they were employed under Dutch law and the working environment.

The qualitative survey data from 2014 and 2016 were coded and categorised using ATLAS.ti software, Version 7.0 (ATLAS.ti GmbH.) for analysis. First, the researcher developed a set of theory-based categories based on the literature on IPE functioning[5,7,9,19] as a framework to structure the data. These categories were as follows: expertise, responsibility, non-expertise, non-responsibility, learning from and with each other, own behaviour and the others' behaviour. Second, the answers to the open-ended questions were read and coded. The codes were structured according to the theory-based categories. From reading the texts, new codes emerged by inductive content analysis. To obtain a theory from the codes, all codes were re-examined and merged into substantive subcategories by constant comparison. An example of the theory-based category of expertise, in which "own expertise of the dental hygiene student" and "own expertise of the dental student" were divided into substantive subcategories, is shown in Figure 3 (the categories with the most encoded passages in this study are included in this figure). Next, the encoding was discussed independently with a colleague researcher, to achieve consensus in analysis and to ensure validity. The codebook used in 2014 was also used in 2016, but new codes for the additional questions were added, and the same process of grounded analysis was used. The results are presented in text and subscribed with quotations from the participants. The quotations were translated into English by the first author, and the accuracy of the translation of each quotation was discussed with the co-authors. Next, all quotations were edited by a native speaker and back translated into Dutch to ensure that the essence of the original Dutch quotations was not lost in translation. Descriptive variables such as "gender", "age" and "workplace" are presented in means (SD) and/or percentages.

TABLE 1 Open-ended questions in baseline and follow-up

Open-ended questions
In which area are you an expert when treating a patient with a dental student/dental hygiene student? Are there cases (in oral care) in which you are not an expert?
What is your responsibility, in oral care, when you treat a patient with a dental hygienist/dentist? Are there areas, in oral care, in which you are not responsible?
What do you teach a dental student/dental hygiene student when you treat a patient together?
What do you learn from a dental student/dental hygiene student when you treat a patient together?
Which behavior (concretize) of the dental hygiene student/dental student contributes to a good collaboration when treating patients? Give an example.
Which behavior of yours a dentist/dental hygienist contributes to a good collaboration when treating patients?

3 | RESULTS

A flowchart shows how the study population was reached (Figure 2). At baseline, there were 100 respondents and at the follow-up 45, with most of the dentists and dental hygienists female (Table 2). A total of 55 respondents were lost in the follow-up for different reasons (Figure 2).

Results from the open-ended questions are presented following the main themes of the questionnaire. In this paper, both at baseline and follow-up the terms "dentist" and "dental hygienist" are used, instead of "student dentist" and "student dental hygienist" at baseline and "dentist" and "dental hygienist" at follow-up.

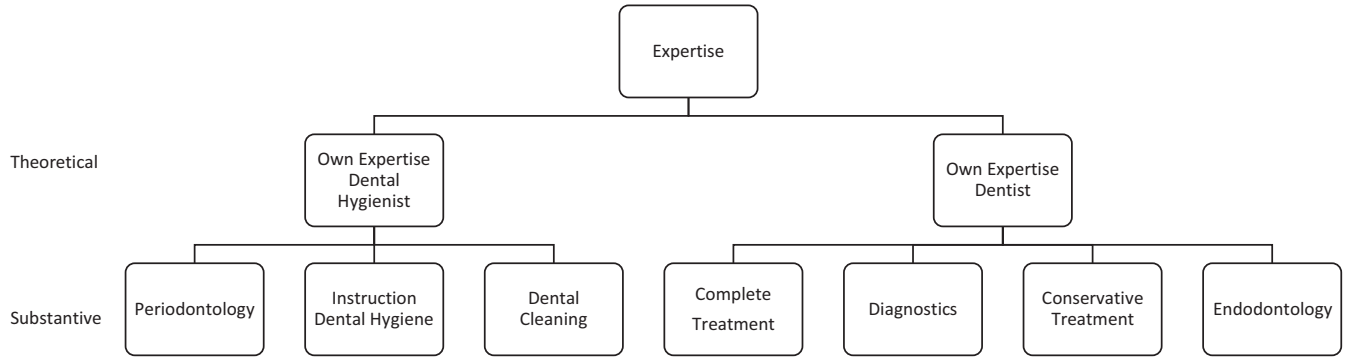

FIGURE 3 Example of coding the data in theoretical and substantive categories of expertise of dental hygienists and dentists

TABLE 2 Demographic characteristics and "workplace and specialisation level of the practice"

	Baseline (n = 100)		Follow-up (n = 45)	
	Dentist (n = 62)	Dental hygienist (n = 38)	Dentist (n = 27)	Dental hygienist (n = 18)
Male	20	3	11	0
Female	42	35	16	18
Mean age (SD)	25.5 (SD = 3.3)	23.0 (SD = 2.0)	27.8 (SD = 4.4)	24.7 (SD = 1.8)
General dental practice[a]			25	16
Specialisation[a,b]			12	9

[a]Professionals could work in general practice and have a specialisation level of practice.
[b]Specialisation level of the practice; for example, centre for periodontology/implantology, paediatrics, orthodontics, geriatrics and endodontology.

3.1 | Expertise in patient care

At baseline, both professions agreed on the dental hygienists' expertise in the non-reserved procedures, such as periodontal skills, oral hygiene instruction and professional removal of plaque and calculus. In general, dental hygienists considered themselves as the experts in prevention. Many dental hygienists expressed the desire to be as good at diagnosing caries as they were at treating periodontal problems, because they considered this to be part of their job. One said:

> *"Personally, I think I'm better at making plans for motivation, oral hygiene and periodontal problems. The dentists are better at diagnosing caries. However, I think that, as a dental hygienist, I should be just as good at assessing caries. It is after all part of my job."*
>
> *(Respondent 16 dental hygienist, 2014)*

No particular difference was found in 2016 concerning their own expertise; they emphasised their expertise in prevention.

At baseline and follow-up, many dentists perceived the expertise of dental hygienists as better than their own expertise, especially in prevention and periodontal skills.

> *"I do not consider myself an expert in providing instructions on good oral hygiene or the use of interdental aids. I also consider myself less skilled at performing initial therapy and comprehensive dental cleanings than my dental hygiene colleague. Although I have no experience in the art of motivational interviewing, I guess I'm less skilled in that as well because it is hardly addressed in our education."*
>
> *(Respondent 52 dentist, 2014)*

The opinions regarding expertise in patient care in interprofessional collaboration showed that both the dental hygienists and dentists agreed on the dental hygienist's expertise.

At baseline and follow-up, the dentists mentioned their own expertise in aspects such as keeping the "overview" or the "helicopter view".

One dentist said:

> *"I am expert in the total overview, the total treatment plan for a patient and dentistry in the general scope with all aspects."*
>
> *(Respondent 14 dentist, 2016)*

Dental hygienists shared this view. In the following quotation, taken at baseline, a dental hygienist states that specific dental treatments and treatment plans are the field of expertise of the dentist.

> *"When I work together with my dentist, there are a number of treatments I don't have the expertise for. For example, when we made a treatment plan of a patient where the etching bridge (front) was released with a huge cavity, I saw that a dentist has much more insight into making a treatment plan. Sometimes patients get into the chair, where they ask: can I have an implant here, or a crown? I always have to consult with my dentist, because he has the expertise to estimate this."*
>
> *(Respondent 15 dental hygienist, 2014)*

3.2 | Responsibilities in patient care

At baseline, both dentists and dental hygienists agreed that the dental hygienist is not responsible for the reserved procedures. However, there were different perceptions about who was responsible for responsibility for the non-reserved procedures. One dental hygienist believed she was responsible for all the treatments she performed:

> *"As a dental hygienist, you are responsible for all the treatments you perform as a practitioner. These may be treatments related to periodontal skills, restoration of*

cavities, check-ups, information, prevention and behavioral change (motivating the patient)."

(Respondent 2 dental hygienist, 2014)

In contrast, another dental hygienist said:

"I am not responsible for the treatments performed by a dental student and outside my competences" (*referring to reserved procedures)*

(Respondent 35 dental hygienist, 2014)

In contrast, all of the dentists at baseline saw all patient treatments as their ultimate responsibility, including the treatment carried out by a dental hygienist. One dentist summarised the expertise and responsibility of a dentist as follows:

"I think that as a future dentist I'm qualified to monitor the patient's entire treatment. I look at the patient as a whole with all their oral problems. I'm responsible for diagnosing and creating a treatment plan, and for ensuring all problems are addressed. In principle, I'm also an expert at all dental treatments, although I believe that dental hygienists are better trained in periodontal treatments. When delegating tasks as a (future) dentist, I must continue to ensure that all treatments are performed properly."

(Respondent 21 dentist, 2014)

At follow-up, the dental hygienists agreed that they were only responsible for the treatments they performed. The dentists saw all patient treatments as their responsibility. For both groups, there was no apparent difference in perception of responsibility at follow-up compared with the baseline results.

3.3 | Learn from and with each other

At baseline, dental hygienists experienced a learning process from making treatment plans together with dentists. There was no change in perception about learning from each other between baseline and follow-up. From attending the CIEP, dental hygienists became more skilled at treatments such as treating initial caries and taking X-rays. From the dental hygienists, the dentists learnt periodontal skills, how to perform oral hygiene instruction and how to remove dental plaque and calculus. Both groups indicated that they could learn from each other in interprofessional collaboration.

"When the prognosis of a tooth is periodontally bad, but an extensive treatment plan is made for the restorative part of the tooth, I can consult with the dentist to make a better plan, which is more favorable for the patient in the long term."

(Respondent 9 dental hygienist, 2016)

3.4 | Own and others' behaviour

The perceptions of the dentists and dental hygienists with regard to interprofessional behaviour were identical. They mentioned behavioural aspects such as communication, insight into expertise, consultation and a positive attitude towards collaborating as important for adequate collaboration. One dentist said:

"Being open to the vision of the dental hygienist, being able to consult well. Equality between dentist and dental hygienist."

(Respondent 5 dentist, 2016)

3.5 | Interprofessional collaboration in daily practice

At follow-up, most dentists expressed the belief that the Dutch legislation related to task redistribution affected interprofessional collaboration positively as they experienced a better distribution of tasks between the dentist and the dental hygienist. This view was clearly different from the dental hygienists' opinion that interprofessional collaboration was not affected by this legislation, because they still did not perform their total area of expertise in daily practice. Both dentists and dental hygienists experienced the CIEP programme as useful for interprofessional collaboration. After the CIEP programme, it became clearer for dentists, which tasks belonged to dental hygienists. The "novice" dentists and dental hygienists had roughly the same perceptions about interprofessional collaboration in practice and education. Nonetheless, a difference was noticed with regard to interprofessional collaborative behaviour between educational training and working in practice. Whilst working in practice, changes in the categories of communication, tasks and the preliminary discussion of the treatment plan were noticed. The dentists mentioned that the dental hygienists performed more tasks in the CIEP programme than in daily practice. In daily practice, dental hygienists did not have the opportunity to perform the expertise as formalised in the law. At follow-up, a dentist said:

"In education, the dental hygienist still did a lot of dental restorative procedures and that is not the case in my practice. She is mainly responsible for the periodontal area."

(Respondent 10 dentist, 2016)

Dentists and dental hygienists mentioned that the number of working hours per week, which was limited by part-time contracts, negatively affected the possibility of consulting each other with regard to patient care:

"If you don't see each other very often it is more difficult to work together. Sometimes speaking to each other in person is really necessary."

(Respondent 14 dentist, 2016)

In addition, interprofessional collaboration in daily practice differed according to workplace and specialisation level of the practice, such as the centre for periodontology, general dental practice or paediatrics.

> *"In my opinion, the dental hygienists' contribution is more worthy in a center for periodontology than in a general dental practice. A periodontologist knows what you are doing. I have the idea that the 'ordinary' dentist does not know what a dental hygienist does and when there are periodontal problems."*
>
> *(Respondent 16 dental hygienist, 2016)*

All respondents agreed that interprofessional collaboration would benefit from good communication (and atmosphere) amongst colleagues.

> *"Communication is very important. When everyone knows what each other's expertise is, you can also ask each other for help."*
>
> *(Respondent 9 dental hygienist, 2016)*

4 | DISCUSSION

This study shows many similarities between the views of dentists and dental hygienists with respect to expertise, responsibilities, learning from and with each other, and the behaviour associated with interprofessional collaboration. Making the transfer from the educational context to professional practice turns out to be difficult due to practice-related factors. Previous studies have shown that mutual respect and improved understanding of roles and responsibilities are crucial for effective collaboration.[8] To know each other professionally means to be familiar with each other's conceptual models, roles and responsibilities. Collaboration is not possible if this basic requirement is not fulfilled. Interaction is therefore required to make use of everyone's professional role in the collaboration.[20] Failure to acknowledge each other's expertise will affect team performance negatively.[7]

Although the CIEP programme created mutual respect and understanding of roles and responsibilities in the long term, it was noticed that in daily practice "novice" dentists and dental hygienists experienced interprofessional collaboration to be in its early development. The "novice" dentists and dental hygienists indicated that interprofessional collaboration differed from what they were taught on the CIEP. The majority of practicing dental professionals did not have the experience of an IPE programme during their education, because their study programme had taken place before the changes in the legislation were made. This makes it difficult for the "novice" professionals to collaborate interprofessionally to the full scope of their practice. Sometimes there is resistance in the professional field to planned proposed legislative amendments regarding task redistribution[17] and the resulting change in collaboration.[11] These changed roles are well defined on paper by legislation, but there are few existing role models in the field.[21] We therefore consider it beneficial for students to start interprofessional learning early in their study programmes. It is expected that this will contribute to a better understanding for each other's professional roles and responsibilities.

The boundaries between what is taught in the educational programme and what is practiced in dental workplaces can lead to problems or challenges in action or interaction.[22] Crossing these boundaries helps professionals to understand each other's language and perspectives and combine these in a new practice.[22] Learning to understand each other and speaking the same language in a new relationship with each other in interprofessional collaboration can create tensions, but can offer substantial learning potential. "Novice" professionals, especially, are the boundary crossers in dental practice.[22] Therefore, in the educational programme, professional identity formation of professionals and boundary-crossing competencies need explicit attention.[23] To prepare students, interprofessional collaboration benefits from incorporating insight into how professionals view their professional identity and how they combine distinct practices.[23] In education, many lecturers are professionals themselves, who were trained in their different programmes and cannot be considered a priori as a role model.

The literature on crossing boundaries may provide a theoretical framework for developing interprofessional education programmes that provide these skills.[23]

The CIEP is taken in the final year of study in both dental educational training programmes, so only in the last year of their education do dental students and dental hygienist students learn how to treat a patient in interprofessional collaboration and share responsibility for joint patient groups. If interprofessional education is offered earlier in the curriculum, we expect that dentists may gain a clearer understanding of what falls within the field of expertise of dental hygienists and vice versa. Moreover, it has been suggested that students will develop a positive attitude towards each other, if they encounter interprofessional education earlier.[24] The arguments against an earlier start concern the lack of skills to solve a problem together, which may create the wrong impression of each other.[7,25] It is important to know one's own professional role to be able to function as a team member.[26]

In accordance with the results of this research, it is argued that interprofessional education benefits from starting at an early stage, which enables early development of more knowledge and understanding of each other's professional roles. An earlier start to interprofessional education in the curriculum at Radboudumc in Nijmegen I was realised in September 2017.[27] Longitudinal research to monitor the effects of interprofessional education and collaboration has started.

4.1 | Strengths and limitations of the study

A strength of this study is the 100% response at baseline. This high response rate was possible because completion of the questionnaire

was made a homework assignment. The research was carried out at only one interprofessional educational programme in the Netherlands, and therefore, it is not entirely representative of all oral healthcare providers in the Netherlands. There were a relatively small number of participants at follow-up. Loss to follow-up was only caused by changes in email addresses of alumni, and we were unable to contact these alumni in other ways. Despite of these limitations, the study is useful for obtaining insight into the perceptions of dental and dental hygiene students after graduation when they work in dental practices and how the perceptions are affected by an educational programme aimed at the improvement of these perceptions.

5 | CONCLUSION

The study provided insight into how the CIEP programme influenced the role perceptions of dental and dental hygiene students in interprofessional collaboration before and two years after their graduation.

The CIEP programme resulted in more understanding amongst dentists and dental hygienists with regard to interprofessional roles. The "novice" dentists and dental hygienists noticed that the professional field differs from education programmes in interprofessional collaboration. The majority of practicing dental professionals were not trained interprofessionally or for conducting different pallets of tasks. This makes it difficult for the "novice" dentists and dental hygienists to apply what they have learned about interprofessional collaboration.

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CONFLICT OF INTEREST

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