Humanisation and health needs in children: present or future?



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DOI 10.23804/ejpd.2024.2012

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Abstract

Aim For a few years, teledentistry has been an emerging innovative strategy with potential in the field of paediatric dentistry. There are still few studies in this regard, so further research is needed to verify and ensure that teledentistry is not only an accessible mode of communication, but above all effective and evidence-based. This study aimed to use a preliminary telematic approach to promote the compliance of patients in the developmental age during the first dental visit.

Materials and methods Two hundred patients were selected according to the eligibility criteria, and distributed in two groups: a study group with the preliminary telematic approach (ATP) before the first visit and a control group with traditional first visit without ATP. Through an ordinal semi-proportional regression model, the degrees of collaboration between the study and control groups were compared, correcting the estimate for age groups, the presence of systemic pathologies, disorders of cognition, attention and learning, degree of anxiety and previous medical-dental experiences.

Results A preliminary telematic approach (teledentistry) was significantly associated with a higher level of collaboration on the first visit than in the control group (OR: 7.88; 95% CI: 3.82-16.26).

Conclusions The preliminary telematic approach could be useful as a support to the traditional paediatric dental visit, to promote better management and fidelity of the patient, reducing anxiety and increasing collaboration during the first visit.

KEYWORDS Teledentistry, compliance, special needs, paediatric dentistry.

Introduction

Teledentistry has been an emerging innovative strategy in paediatric dentistry for a few years [Wallace et al., 2021]. Indeed, it is a strategy that may be useful for providing diagnosis and dental care in remote locations, for behavioural coaching, reducing anxiety by providing instruction and advice to parents before the next appointment, and for monitoring preventive care or follow-up post-treatment [Sharma et al., 2021]. However, there are still few studies that validate this clinical communication tool in terms of efficacy and scientific evidence [Williams, 2021]. This method of communication now appears to have been cleared through Art. 78 of the National Deontological Consultation of the FNOMCEO (Federazione Nazionale degli Ordini dei Medici Chirurghi e degli Odontoiatri) : «The doctor pursues the maintenance of the relationship of trust with the patient in the diagnosis, therapy and monitoring of health conditions remotely, through tools and services that use the technologies of the information and communication". The appropriate use of a teledentistry system could also help improve the compliance of patients in the developmental age from the first visit, reducing their anxiety and stress related to the procedures [Wallace et al., 2021; Sharma et al., 2021]. The present study aimed to evaluate the effectiveness of a preliminary telematic approach (ATP) compared to the traditional approach face to face to promote better collaboration among patients in the developmental age during the first dental visit. A further objective was to identify possible predictive factors for greater compliance. Lastly, the exploratory objective was to investigate the level of parental satisfaction.

Materials and Methods

A sample of 200 patients sent for a first visit between December 2022 and February 2023 at the Paediatric Dentistry Department of the University of Rome "Tor Vergata" was considered, and selected based on the following eligibility criteria:

Inclusion Criteria

- First-visit patients who have not had previous dental treatment
- Patients aged 0 to 16 years
- Participation in the parents/guardian (video calls)

Exclusion criteria

- Patients already being treated at the structure
- Patients undergoing previous dental therapies (other structure)
- Patients over 16 years of age
- Dental emergencies (e.g. trauma, pulpits).

Based on the personal data recorded during the first phone call, the patients were distributed into two homogeneous groups by age and gender:

- Experimental study group: Preliminary telematic approach

followed by a visit to the structure (100 patients)
- Control group: Traditional visit without ATP (100 patients).

Experimental Protocol

A telematic approach with the paediatric dentistry team has been scheduled after sending the information relating to the study modality by text message or e-mail, for signing the informed consent. Using electronic support (smartphone/computer) on which applications such as Skype or WhatsApp were installed, a preliminary telematic approach (or ATP) was performed at T0 with a programmed time of about 15 minutes, conducted by dental operators trained in the telephone approach method, divided into two phases:

1. First Phase: an interview with the parent during which all the general anamnestic information of practice was collected and some information relating both to the state of anxiety and fear of the young patient (absent during the conversation) and to his relationships, to any behavioural or attention disorder, the relationship with the paediatrician or about previous dental experiences. Furthermore, based on the procedures indicated by the Ministry of Health, information on the "patient's living environment" was acquired to know the variables of which his behaviour is a function [Paglia and Beretta, 2021]. All the information has been reported on the management system. Finally, the parent was provided with information relating to the organisation of the structure, the methods of approach and the necessary for correct preparation for the first visit.
2. Second Phase: an interview with the patient (in the presence of the parents), during which questions were asked through a questionnaire aimed at building an initial positive relationship with the dentist with whom he would then begin the dental clinical journey. To prepare a correct preventive, diagnostic and therapeutic approach, the patients were classified based on the degree of collaboration and autonomy (according to the "Indications for taking charge of patients with Special Needs who require odontostomatological care - Ministry of Health):

- Uncooperative patients
- Non-autonomous poorly cooperative or cooperative patients
- Autonomous patients but not very cooperative
- Autonomous and collaborative patients.

At T1, the visit was subsequently carried out and the medical record was compiled, integrating the information collected during the preliminary online meeting with the parents and with the patient. At the same time, the degree of collaboration was assessed according to Frankl's Scale and a satisfaction questionnaire was submitted to the parent..

Control Group

In the control group, the first visit was performed as common clinical practice and the degree of collaboration was assessed using the Frankl's Scale.

Degree of collaboration

In both groups, the degree of collaboration was assessed using the Frankl's Scale [Frankl et al., 1962]:

- Degree 1: Refusal of treatment, violent crying, fear or any other obvious evidence of extreme negativity.
- Degree 2: Reluctance to accept treatment, uncooperative behaviour, evidence of a negative, but not overly pronounced, attitude.
- Degree 3: Acceptance of treatment, sometimes cautious, willingness to collaborate with the dentist, sometimes with reservations.
- Degree 4: Good relationship with the dentist, interested in clinical procedures, laughs and lives the session positively.

Statistical Analysis

All data was collected anonymously in an Excel database. All variables were summarised using counts and percentages. The Frankl's Scale scores obtained in the two groups were compared using a semi-proportional ordinal multiple regression model to allow modelling of efficacy across the Frankl score range. In this regard, the "gologit2" package of the STATA 17.0 statistical software (StataCorp LLC. Stata Statistical Software: Release 17. College Station, TX:, USA) was used. The selection of the variables introduced in the regression model was carried out using Akaike and Bayesian Information Criteria. The stability of the model was evaluated by visual analysis of the standard errors of the outcomes predicted by the model. Finally, in an exploratory way, the distribution of the Frankl score of the two groups was compared producing descriptive statistics stratified by patient characteristics (ex: between males and females, or by age group). Any differences in the efficacy of the televisit depending on the characteristics of the subject were researched by introducing the interaction factor "treatment x characteristic" in the ordinal regression model.

Results

Descriptive Analysis

The study sample consisted of 40% males and 60% females. 14% of the sample was under 6 years of age, 70% were between 6 and 11 years of age, and 16% were over 12 years of age. The distribution of patient characteristics was balanced between the two study groups (Table 1).

Efficacy of preliminary telematic approach (or ATP)

The ordinal regression model (Table 2) shows how the preliminary telematic approach (ATP) is strongly associated with a higher level of collaboration than the control group (OR: 7.88; 95% CI: 3.82-16.26). Therefore, a patient under equal conditions (age, gender, pathologies and disorders taken into consideration) has an almost eight times greater probability of obtaining a higher degree of collaboration through ATP than the control group. The model also indicates a strong dependence on the degree of collaboration and autonomy encountered during ATP. More precisely, self-reliant patients with low compliance or non-cooperation showed greater compliance at the first visit than dependent patients with low compliance or non-cooperation ($p<0.001$). Interaction factor analysis did not suggest that ATP efficacy may depend on patient characteristics. The distribution of standard errors of the outcome showed good stability of the model.

Stratified Analysis

Degree of collaboration and autonomy

As for the non-cooperative patients, in the control group, 58.3% reported a degree of collaboration equal to 1, 16.67% reported a grade of 2, and 25% reported a grade of 3. In the experimental group, the non-cooperative patients reported a degree of collaboration 1 at the first visit in 9% of cases, 2 in 27.27% of cases and 3 in 63.64% of cases. No patient reported a degree of collaboration equal to 4.

	Control group %		Experimental Group %	p
Gender	Male	40	40	0.754
	Female	60	60	
Age	1-5	14	18	0.734
	6-11	70	66	
	12-16	16	16	
Degree of collaboration and autonomy *	Uncooperative patients	12	11	0.089
	Non-autonomous poorly cooperative or cooperative patients	5	6	
	Autonomous patients but not very cooperative	26	42	
	Autonomous and collaborative patients	57	41	
Anxiety	Yes	50	50	1
	No	50	50	
Behavioural or attention disorders	Yes	28	25	0.631
	No	72	75	
Dental Experience	Yes	42	34	0.244
	No	58	66	

TABLE 1 Descriptive analysis of two study groups.

In non-autonomous patients who were poorly cooperative or cooperative, 80% in the control group reported a degree of collaboration equal to 1, while 20% reported a grade of 3. In the experimental group, however, patients reported a degree of collaboration 1 in 16.67% of cases, 2 in 50% of cases, 3 in 16.67% and 4 in 16.67% of cases. In the poorly cooperative autonomous patients, no patient reported a degree of collaboration equal to 1 while 57.69% in the control group reported a degree of collaboration equal to 2, 30.77% reported a degree of 3 and 11.54% a degree of 4. In the group experimental, instead, the patients reported a degree of collaboration 1 in 2.38% of the cases, degree 2 in 9.52% of the cases while 50% of the cases reported a degree 3 and 38.10% a degree 4.

In the autonomous collaborating patients, 1.75% of the patients in the control group reported a degree of collaboration at the first visit equal to 1 while 7.02% equal to 2, 26.32% a degree 3 and 64.91% a degree 4. In the experimental group, instead, patients reported a degree of collaboration of 1 in 2.44% of cases, 2 in 0%, and 3 in 7.32% of cases while 90.24% reported a degree of collaboration equal to 4 (Table 3).

The interaction "treatment x degree of cooperation", when introduced into the ordinal regression model, did not show statistical significance.

Age

By comparing the degree of collaboration of the two groups based on the age groups of the patients, a more evident difference was found in patients of early childhood compared to adolescents. In fact, in patients aged 0-5 years, it is possible to note how 11.11% of the patients in the experimental group show a degree of collaboration 1 at the first visit, 16.67% with grade 2, 44.44% with grade 3 and 27.78% with grade 4. While in the control group, we find 21.43% of the patients with grade 1, 21.43% with grade 2 and finally 50% with grade 3 and 7.14% with grade 4. In the same way, albeit with less evidence, in the age group 6-11 there is a higher percentage of patients with a degree of collaboration of 4 (59%) than in the control group (42%) and a lower percentage with a degree of collaboration 1 (1.52%) compared to the control group (11.43%). Instead, in patients aged 12-16 the degree of collaboration of the two groups appears to be almost superimposable, while still presenting satisfactory results, as shown in Table 4. The interaction between "treatment" and "age category" did not show statistical significance within the ordinal regression model.

Pathologies

Genetic syndromes and systemic pathologies were found in both study groups, the prior knowledge of which (in the study group) allowed the programming of an approach more dedicated to the patient's needs during the first visit in presence. In fact, in patients with systemic pathologies or genetic syndromes it was possible to find a low percentage (5% of grade 1 and 15% of grade 2) of non-cooperative patients during the first visit compared to the control group (30% of grade 1 and 25 % of grade 2) (Table 5) as well as a higher percentage of patients with a high degree of collaboration (3 or 4) respectively 50% and 30%, compared to the control group where instead there is 20% with grade 3 and 25% with grade 4. Statistical significance was not found for the interaction between "treatment" and "patologies" in the ordinal regression model.

Attention or behavioural disorders

In the experimental group, during the conversation performed in the absence of the child, the parents could highlight pathologies, negative medical-dental experiences, specific learning, attention or behavioural disorders of their children with greater serenity.

Furthermore, it was possible to identify some data that was not significant for the parents, but which led the clinician to doubt yet undiagnosed disorders, which were followed by subsequent specialist investigations.

Taking these patients into consideration, 12% with degree of collaboration 1, 12% with grade 2, 24% with grade 3 and 52% with grade 4 were found in the experimental group. In the control group, however, 10.71% with degree 1, 17.86% with degree 2 while 28.57% and 42.86% showed a degree of collaboration 3 and 4 respectively (Table 6).

Anxiety

Subsequently, the degree of collaboration was compared in patients for whom a grade 3 or 4 (high or very high) anxiety and fear was reported (reported by parents according to a scale from 1 to 4) also finding a greater percentage of patients with degree

Degree of collaboration	Odds ratio	P > |z|	95% Confidence interval
1 vs 2, 3 or 4 Type of Visit			
Preliminary Telematic Approach (ATP)	7.88	0.000	3.81 – 16.26
Age			
7-11	0.53	0.189	0.21 – 1.36
12-16	1.02	0.987	0.13 – 7.87
Gender			
Male	1.03	0.933	0.55 – 1.90
Degree of Collaboration and Autonomy			
1	0.36	0.192	0.08 – 1.66
2	9.58	0.000	3.30 – 27.77
3	26.62	0.000	5.05– 140.32
Previous medical experience	0.80	0.511	0.41 – 1.57
Behavioural or attention disorders	1.20	0.592	0.61-2.39
Sistemical Pathologies	0.84	0.661	0.39-1.82
Anxiety > 2	1.80	0.065	0.96 – 3.35
Degree of collaboration	Odds ratio	P > |z|	95% Confidence interval
1 or 2, vs 3 or 4 Type of Visit			
Preliminary Telematic Approach (ATP)	7.88	0.000	3.81 – 16.26
Age			
7-11	0.53	0.189	0.21 – 1.36
12-16	0.24	0.050	0.06 – 0.99
Gender			
Male	1.03	0.933	0.55 – 1.90
Degree of Collaboration and Autonomy			
1	0.36	0.192	0.08 – 1.66
2	9.58	0.000	3.30 – 27.77
3	122.63	0.000	30.43– 494.20
Previous medical experience	0.80	0.511	0.41 – 1.57
Behavioural or attention disorders	1.20	0.592	0.61-2.39
Sistemical Pathologies	0.84	0.661	0.39-1.82
Anxiety > 2	1.80	0.065	0.96 – 3.35
Degree of collaboration	Odds ratio	P > |z|	95% Confidence interval
1 or 2, vs 3 or 4 Type of Visit			
Preliminary Telematic Approach (ATP)	7.88	0.000	3.81 – 16.26
Age			
7-11	0.53	0.189	0.21 – 1.36
12-16	1.02	0.971	0.26 – 3.98
Gender			
Male	1.03	0.933	0.55 – 1.90
Degree of Collaboration and Autonomy			
1	0.36	0.192	0.08 – 1.66
2	9.58	0.000	3.30 – 27.77
3	251.31	0.000	62.66– 1007.911
Previous medical experience	0.80	0.511	0.41 – 1.57
Behavioural or attention disorders	1.20	0.592	0.61- 2.39
Sistemical Pathologies	0.84	0.661	0.39-1.82
Anxiety > 2	1.80	0.065	0.96 – 3.35

TABLE 2 Semi-proportional ordinal regression model corrected for age, gender, degree of collaboration and autonomy, presence of pathologies, attention and learning disorders and previous medical-health experiences.

Experimental Group	Degree of collaboration and autonomy(T0)			
Degree of collaboration (Frankl's Scale)	Uncooperative patients	Self-sufficient patients who are not very cooperative	Self-sufficient patients who are not very cooperative	Self-collaborating patients
1	1 (9.09%)	1 (16.67%)	1 (2.38%)	1 (2.44%)
2	3 (27.27%)	3 (50%)	4 (9.52%)	0 (0%)
3	7 (63.64%)	1 (16.67%)	21 (50%)	3 (7.32%)
4	0 (0%)	1 (16.67%)	16 (38.10%)	37 (90.24%)
Total	11	6	42	41
Experimental Group	Degree of collaboration and autonomy(T0)			
Degree of collaboration (Frankl's Scale)	Uncooperative patients	Self-sufficient patients who are not very cooperative	Self-sufficient patients who are not very cooperative	Self-collaborating patients
1	7 (58.33%)	4 (80%)	0 (0%)	1 (1.75%)
2	2 (16.67%)	0 (0%)	15 (57.69%)	4 (7.02%)
3	3 (25%)	1(20%)	8 (30.77%)	15 (26.32%)
4	0 (0%)	0 (0%)	3 (11.54%)	37 (64.91%)
Total	12	5	26	57

TABLE 3 Comparison of the degree of collaboration between the study and control groups taking into consideration the degrees of collaboration and autonomy at T0.

(0-5 aa) Degree of collaboration (Frankl's Scale)	Control		Experimental	
	n	%	n	%
1	3	21.43	2	11.11
2	3	21.43	3	16.67
3	7	50.00	8	44.44
4	1	7.14	5	27.78
(6-11 aa) Degree of collaboration (Frankl's Scale)	Control		Experimental	
	n	%	n	%
1	8	11.43	1	1.52
2	14	20	5	7.58
3	18	25.71	21	31.82
4	30	42.86	39	59.09
(12-16 aa) Degree of collaboration (Frankl's Scale)	Control		Experimental	
	n	%	n	%
1	1	6.25	1	6.25
2	4	25	2	12.50
3	2	12.50	3	18.75
4	9	56.25	10	62.50

TABLE 4 Comparison of the degree of collaboration between the study and control groups taking into consideration three age groups: 0-5, 6-11 and 12-16.

of collaboration 4 in the experimental group (48%) compared to the control group (34%) and a lower percentage of patients with degree of collaboration 1 (6%) compared to the control group (12%) as shown in the Table 7. No statistically significant "treatment x anxiety" was found in the ordinal regression model.

Previous medical experience

A subgroup of these patients was represented by subjects with previous negative medical-dental experiences for which an exploratory investigation was carried out which showed a greater percentage (85%) of patients with a degree of collaboration 3 or 4 post-ATP, compared to the control group in which only 38% showed a degree of collaboration 3 or 4. No statistical significance was found when medical and dental experiences interacted with treatment in the regression analysis.

Satisfaction questionnaire

A degree of satisfaction equal to about 90% of parents was highlighted, who considered the preliminary telematic approach useful in the function of the considerable saving of time during the first visit in presence, especially in consideration of the collaborative attitude of the child, reporting moreover, greater serenity in describing the state of health of one's child during the first phase of the telematic interview.

Discussion

Dental prevention and early diagnosis are the fundamental issues at the centre of the protection of oral health in the entire population with attention focused on developmental age [Subbalekshmi et al., 2017]. It's necessary to have greater and better accessibility to dental services and the offer on the territory,

Degree of collaboration (Frankl's Scale)	Control		Experimental	
	n	%	n	%
1	6	30	1	5
2	5	25	3	15
3	4	20	10	50
4	5	25	6	30

TABLE 5 Comparison of the degree of collaboration between study and control group considering the presence of systemic pathologies and genetic syndromes.

Degree of collaboration (Frankl's Scale)	Control		Experimental	
	n	%	n	%
1	3	10.71	3	12
2	5	17.86	3	12
3	8	28.57	6	24
4	12	42.86	13	52

TABLE 6 Comparison of the degree of collaboration between the study and control groups considering the presence of specific learning, behaviour and attention disorders.

Degree of collaboration (Frankl's Scale)	Control		Experimental	
	n	%	n	%
1	6	12	3	6
2	10	20	4	8
3	17	34	19	38
4	17	34	24	48

TABLE 7 Comparison of the degree of collaboration between the study and control groups in patients with anxiety grade 3 or 4.

socially sustainable, with optimisation of the times of commitment by the "accompanying" parents during therapies for which a dedicated approach is also required the degree of patient collaboration about age and emotional state [McLaren and Kopycka-Kedzierawski, 2015]. To prepare an ad hoc therapeutic path, it is important to also acquire information relating to the patient's social context, cultural level, habits and lifestyles, establishing correct communication which represents the set of verbal stimuli capable of guaranteeing compliance, therapeutic alliance and acceptance of the prevention and/or treatment plan [Paglia and Beretta, 2021]. The knowledge and use of telemedicine in dentistry have increased significantly after the onset of the pandemic to reduce the diffusion of the COVID-19 virus and to promote remote health care when possible [Williams, 2021]. It was found that during the pandemic period about 93% of dentists used teledentistry for their clinical practice and 60% of dentists continued to use it even after the end of the pandemic [Plaza-Ruíz et al., 2021; Byrne and Watkinson, 2021]. Considering the results reported in the present study, it is conceivable that teledentistry can be used to support common clinical practice, both for a better and dedicated motivational approach to the patient in the developmental age, and in terms of savings of time and costs by families [Sharma et al., 2021; Viswanathan et al., 2022]. These results are also in agreement with Mandall et al. and Wallace et al., according to which among the advantages of teledentistry we must consider on the one hand the reduction of costs associated with the accompaniment of the minor and the travel times and on the other hand the time usually taken away from work and school [Mandall et al., 2005; Wallace et al., 2021]. Furthermore, it was possible to note how during the conversation in the absence of the child, a greater serenity and ease was found on the part of the parent to expose latent critical issues, such as suggesting to the operator the use of an approach dedicated to the patient and in some cases the need for further diagnostic investigations for suspected pathologies. Indeed, the results of the present study are attributable on the one hand to the prior knowledge of the dental team and so to the fidelity acquired during the ATP and on the other hand to the knowledge of health needs and/or any doubts that have arisen, already during the online interview. Moreover, the logistic regression model found the effectiveness of the telematic method eight times higher than the traditional visit for better collaboration at the first visit. Finally, it was found in agreement with other Authors [Sanghvi et al., 2021; Byrne and Watkinson, 2021; Wallace et al., 2021] also parental approval for the use of this telematic procedure. There were no additional costs to budget because, as regards the telematic tool, normally available electronic support (smartphones, iPads, computers) on which applications such as Skype or WhatsApp were installed were used.

Conclusions

From the results of this study, it is possible to affirm the validity of the preliminary telematic approach as a support to the traditional paediatric dental visit, to promote better management and fidelity of the patient, reducing anxiety and increasing collaboration from the first visit. In conclusion, we can therefore undoubtedly believe that a correct approach to the child, remains the key to success in paediatric dentistry, cannot disregard the ethical value which inspires the humanisation aimed at guaranteeing the quality of assistance, considering the adult person and child, in its physical, social and psychological whole.

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