Does a Clinician's Sex Influence Treatment Decisions?

Nicola U. Zitzmann, Prof Dr Med Dent, PhD^a/Elisabeth Zemp, Prof Dr Med^b/ Roland Weiger, Prof Dr Med Dent^a/Niklaus P. Lang, Prof Dr Med Dent, MS^c/ Clemens Walter, Assist Prof Med Dent^d

> Purpose: As more women are entering health professions, the health care system is becoming more feminized. This investigation evaluated gender differences in clinicians' treatment preferences and decision making in a complex treatment situation. Materials and Methods: A questionnaire was developed containing clinical cases and statements to assess practitioners' opinions on treatment of periodontally involved maxillary molars and implant therapy with sinus grafting. Data were analyzed with respect to the clinicians' sex, and an overall logistic regression was performed to further investigate possible influences of age, office location, and specialty. Results: Three hundred forty questionnaires were evaluated (response rate: 35.1%). The mean age of female respondents (37%) was 42 years, and the mean age of male respondents was 46 years. Significantly fewer women reported performing implant placement (35% vs 63%), sinus grafting (16% vs 43%), and periodontal surgery (57% vs 68%). Female practitioners tended to refer more patients to specialists. Participants favored sinus grafting more often for their spouses than for themselves. Apart from a preference for regenerative periodontal surgery among women, no gender differences were observed for treatment decisions or views on general statements related to implant preference, tooth maintenance, or conventional reconstructive therapies. Conclusions: With similar expert knowledge, treatment decisions were made irrespective of sex. While the majority of male care providers performed complex therapies themselves, female clinicians referred more patients to specialists. Int J Prosthodont 2011;24:507-514.

n medical fields, it is now recognized that a practitioner's sex may influence diagnosis, decision making, and therapy, notwithstanding the guidelines set by evidence-based medicine. Female physicians have been found to pay greater attention to the social and preventive aspects of patient care¹⁻³ and to be more sensitive and empathetic.⁴ With breast cancer patients,

Correspondence to: Nicola U. Zitzmann, Department of Periodontology, Endodontology, and Cariology, University of Basel, Hebelstrasse 3, 4056 Basel, Switzerland. Fax: +41-61-2672659. Email: n.zitzmann@unibas.ch female surgeons recommended breast-conserving surgery more often, while male surgeons more often recommended mastectomies.⁵ Female physicians were more likely than male physicians to test bone density in the management of osteoporosis,⁶ and the physician's sex was an independent predictor of drug treatment in heart failure patients.⁷

In dentistry, few studies have been conducted on gender differences in decision making or treatments provided. Female clinicians tend to know more about oral manifestations and the physical cues of eating disorders.⁸ Male practitioners in the United States reported performing more biopsies, conscious sedation, periodontal surgery, extractions, and implants than female clincians.⁹ In a Swedish survey on prosthodontic decision making, individuals were found to vary greatly in how they evaluated patients' wishes, the condition of abutment teeth, and treatment prognosis, but female clinicians tended to consider the patient's age, general health, and oral health condition more important than male clinicians.¹⁰ Male respondents reported providing more prosthodontic units, both fixed and removable, than female practitioners.¹¹

^aProfessor, Department of Periodontology, Endodontology, and Cariology, University of Basel, Basel, Switzerland.

^bProfessor, Swiss Tropical and Public Health Institute, Basel, Switzerland; Professor, Institute of Social and Preventive Medicine, University of Basel, Basel, Switzerland.

^cProfessor Emeritus, University of Berne, Berne, Switzerland; Professor of Implant Dentistry, The University of Hong Kong, Prince Philip Dental Hospital, Hong Kong SAR, PR of China.

^dAssistant Professor, Department of Periodontology, Endodontology and Cariology, University of Basel, Basel, Switzerland; Assistant Professor, Department of Oral Surgery, School of Dentistry, University of Birmingham, Birmingham, United Kingdom.

The maxillary molar region with periodontal involvement is appropriate to evaluate practitioners' treatment decisions because it comprises almost all facets of dental treatment options. These range from less invasive tooth-keeping approaches to more invasive surgical treatments, including dental implants possibly requiring bone grafting of the maxillary sinus.¹²

The aim of this study was to evaluate gender differences in practitioners' attitudes, treatment preferences, and treatment decisions for periodontally involved maxillary molars.

Materials and Methods

Clinicians in Switzerland and Germany were surveyed from March to September 2009. Details about the questionnaire design, distribution, and validity have been reported previously.¹³ Briefly, the questionnaire comprised 24 questions divided into 4 sections.

The first section focused on the practitioner's demographic data and individual characteristics: age, sex, nationality, year of graduation, city and country of graduation, completion of further training program, type of specialty, and practice type.

The second section related to the clinician's experience in placing dental implants, performing sinus floor elevation procedures, and performing periodontal surgeries according to different methods in their daily practice. Participants were asked whether they themselves would be willing to undergo sinus grafting or whether they would agree to their spouse undergoing this treatment.

In the third section, four different clinical situations of increasing pathologic severity were documented with clinical descriptions and radiographs (Fig 1). Patients were described as healthy, not requiring regular medication, and keen to avoid removable dental prostheses if at all possible. No financial constraints were involved, and it was not relevant whether the clinician would perform the treatment him- or herself or in collaboration with a specialist. Participants were asked to indicate which of 3 to 5 treatment options they would recommend to their own patients in this particular situation.

The fourth section required participants to agree or disagree with general statements about tooth prognosis and decision making in dentistry, or mark "don't know."

Statistical Analysis

Participants were grouped according to sex and age cohorts of 25 to 34, 35 to 44, 45 to 54, and 55 to 70 years. They were categorized as periodontists,

prosthodontists, surgeons (oral or maxillofacial surgery), or other (orthodontics, endodontics, or pediatric dentistry). Their practices were classified as clinics with 5 or more clinicians, group practices with 2 to 4 clinicians, or single-clinician practices. The location of their offices was identified as in Switzerland or Germany to evaluate a possible influence of country differences. For the descriptive analysis, cross tables were reported as counts and percentages within groups (men or women). Metric variables were reported as means and standard deviations. Two relative values were compared using the Fisher exact test, while differences related to two different statements (sinus graft for yourself vs for your spouse) were analyzed within groups using the McNemar test. The level of significance was set at $\alpha = .05$ (two-sided). For the results related to the clinician's experience in placing dental implants and performing sinus floor elevation procedures and periodontal surgeries, which revealed gender differences, logistic regression models were performed. The investigated predictors in addition to sex were office location, specialty, and age. All predictors were included in an overall logistic regression model and provided odds ratios (ORs), while 95% confidence intervals (Cls) and the corresponding P values (Wald test) were analyzed to estimate the significance of the predictors. For the ranking of the influencing parameters, the highest (and lowest) ORs were detected, but the smallest *P* values (with confined Cls) were considered as most important. All calculations were performed using the statistical package R (The R Foundation for Statistical Computing, version 2.9.2).

Results

The response rate was 35.1%, with 340 questionnaires returned (82 of 212 from dentists at universities and 258 of 757 from dentists attending continuing education courses and meetings).

Section One

The mean age of respondents, of whom almost two thirds were male, was 44.7 \pm 11.1 years (range: 25 to 70 years) (Fig 2). The mean age of men was 46.4 \pm 10.9 years (range: 27 to 70 years), and they were more evenly distributed across all age groups. The participating women were on average 41.8 \pm 10.8 years old (range: 25 to 66 years), with a tendency for there to be more women in the younger age groups (*P* = .062, Fig 2). The majority of respondents were German (55.5%) or Swiss (40.6%), while 3.9% had a different nationality. Nearly half of the German respondents were

© 2011 BY QUINTESSENCE PUBLISHING CO, INC. PRINTING OF THIS DOCUMENT IS RESTRICTED TO PERSONAL USE ONLY.. NO PART OF MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM WITHOUT WRITTEN PERMISSION FROM THE PUBLISHER

Fig 1 Four different clinical situations were presented, and participants were asked to indicate the treatment option they would recommend to their patient.



Fig 1a The maxillary right first molar shows a through-andthrough furcation involvement (degree III) from buccal, mesial, and distal aspects. Tooth is nonmobile (degree 0). The first and second molar and second premolar tested positive for sensitivity. The second molar and premolar have no decay, circular probing pocket depths of 2 to 3 mm, and mobility degree 0. The second molar has no furcation involvement.



Fig 1b The maxillary right second premolar is missing, and the first molar shows a through-and-through furcation involvement (degree III) from buccal, mesial, and distal aspects. The second molar and first premolar have circular probing pocket depths of 2 to 3 mm, mobility degree 0, no furcation involvement, and tested positive for sensitivity.



Fig 1c Maxillary free-end situation with missing molars. The maxillary left premolars have circular probing pocket depths of 2 to 3 mm, mobility degree 0, and tested positive for sensitivity. The first premolar has no furcation involvement.



Fig 1d Maxillary anterior dentition maintained (canine to canine). The maxillary anterior teeth have circular probing pocket depths of 2 to 3 mm, mobility degree 0, and all apart from the right canine tested positive for sensitivity.

women (46.4%), but fewer than a quarter of the Swiss clinicians who participated were women (23.9%).

Almost half (45.6%) of respondents reported having had some specialist training (43.9% of all women and 48.4% of all men). Specialized female clinicians tended to have other types of specialization (40.8%), but 25.9% were periodontists, 18.5% were prosthodontists, and 14.8% were surgeons. Among the specialized men, 32.3% were periodontists, 25.5% were prosthodontists, 15.7% were surgeons, and 26.5% were other. These variations in gender distribution among the specialties were not statistically significant (P = .316).



Fig 2 Proportions of women and men in the different age groups.

		All	Women	Men	Р
Place dental implants	Yes:	52.4	34.7	63.1 [†]	< .001
Perform sinus grafting	Yes:	33.0	16.1	42.8 [†]	.014
Perform periodontal surgery	Yes:	63.9	56.9	67.9 [†]	.043
Refer patients for implant placement	Yes:	48.8	58.9	42.8 [†]	.005
Would you yourself go for sinus grafting?*	Yes: No:	55.4 15.3	51.2 15.7	57.8 15.0	.260
Would you let your spouse go for sinus grafting?*	Yes: No:	59.7 12.2	56.1 12.2	61.8 12.3	.360

 Table 1a
 Results of the Questions Related to Implant Placement and Sinus Grafting (%)

"Don't know" also a possible response.

[†]Statistically significant difference between women and men (P < .05).

Slightly more women practitioners reported working in clinics than men (22.7% vs 18.2%), 44.6% said they were in a practice with 1 to 3 colleagues compared to 47.9% of men, and roughly a third were sole practitioners (32.7% of women, 33.9% of men).

Section Two

Far fewer women reported placing dental implants than men (Table 1a, P < .001), with the youngest age group placing the most (47.1% of women compared to 63.4% of men). Among those placing implants, women tended to indicate placing fewer implants per year than men, with 69.8% placing < 50 implants per year (men: 51.1%), 18.6% placing 50 to 100 implants (men: 30.4%), and 11.6% placing > 100 implants (men: 18.5%). Sinus grafting was performed by one third of all respondents, and far more frequently by men than women (P = .014). Female clinicians reported referring patients for implant placement more frequently than males (P = .005). Only 5.7% of men but 13.8% of women reported never placing implants or referring patients for this treatment. Women reported performing periodontal surgery less often than men (P = .043, Table 1a), with lower frequencies per year. Participants favored sinus grafting more often for their spouses than for themselves (P = .022), without differences between women and men (Table 1a).

According to the overall logistic regression analysis, sex turned out to be one of the most decisive predictors, with a greater likelihood of men than women in placing dental implants (OR: 3.05, P < .001), performing sinus grafting (OR: 3.73, P = .002), and including periodontal surgery (OR: 1.90, P = .016) in their repertoires (Table 1b). For implant placement, specialty was a similarly decisive predictor: Those with no specialties (OR: 0.30, P = .002) or other specialties

(OR: 0.33, P = .022) were more likely not to have implant placement in their repertoire than periodontists. Another significant predictor was office location (OR: 0.44, P = .002) and older age (OR: 0.39, P = .019). With regard to sinus grafting, older age (OR: 0.23, P = .009 and OR: 0.26, P = .029) was the second strongest predictor after sex, followed by specialty, with those participants without specialization (OR: 0.31, P = .030) being more likely not to perform sinus grafting than periodontists. With regard to periodontal surgery, specialties other than periodontics (prosthodontics: OR = 0.27, P = .072; surgery: OR = 0.10, P = .002; other: OR = 0.07, P < .001; or no specialty: OR = 0.15, P = .002) were by far the strongest predictors that periodontal surgery would be absent in the repertoire, followed by office location and then sex. Although the proportion of male practitioners was smaller in Germany than in Switzerland, office location was a significant predictor of implant placement and periodontal surgery, with higher prevalence in Germany.

Section Three

For the first situation, a furcation-involved maxillary molar with sound adjacent teeth, women selected the regenerative treatment option more often than men (Fig 1a, Table 2a). For the situation with a single-tooth gap (second maxillary premolar) and a first molar with furcation involvement (Fig 1b, Table 2b), the majority of participants selected implant placement with sinus grafting and maintenance of the second molar, irrespective of sex. Also, for the free-end situation (Fig 1c, Table 2c) and for the bilateral free-end situation with an anterior residual dentition (Fig 1d, Table 2d), only small variations were observed in the treatment recommendations given by women and men.

Table 1b	Overall Logistic Regression Model for
Predictors	Influencing Clinician's Experience

Statements to predict/ Predictors	OR (95% CI)	P (Wald test)
Place dental implants (yes ve	s no)	
Sex (male vs female)	3.05 (1.80–5.19)	< .001
Office location (Germany vs Switzerland)	0.44 (0.26-0.75)	.002
Specialty		
Pros vs perio	1.08 (0.34–3.46)	.897
Surgery vs perio	1.45 (0.39–5.33)	.575
Other vs perio	0.33 (0.13–0.85)	.022
None vs perio	0.30 (0.14-0.64)	.002
Age (y)		
35 to 44 vs 25 to 34	1.23 (0.60–2.55)	.573
45 to 54 vs 25 to 34	0.50 (0.24–1.04)	.065
55 to 70 vs 25 to 34	0.39 (0.18–0.86)	.019
Perform sinus grafting (yes v	s no)	
Sex (male vs female)	3.73 (1.63–8.53)	.002
Office location (Germany vs Switzerland)	2.06 (0.95-4.46)	.066
Specialty		
Pros vs perio	0.72 (0.20-2.68)	.630
Surgery vs perio	0.88 (0.20–3.93)	.865
Other vs perio	0.42 (0.11–1.61)	.206
None vs perio	0.31 (0.11–0.89)	.030
Age (y)		
35 to 44 vs 25 to 34	0.40 (0.14–1.12)	.080
45 to 54 vs 25 to 34	0.23 (0.07–0.69)	.009
55 to 70 vs 25 to 34	0.26 (0.08–0.87)	.029
Perform periodontal surgery	(yes vs no)	
Sex (male vs female)	1.90 (1.13–3.21)	.016
Office location (Germany vs Switzerland)	2.05 (1.20-3.51)	.009
Specialty		
Pros vs perio	0.27 (0.06–1.12)	.072
Surgery vs perio	0.10 (0.02–0.43)	.002
Other vs perio	0.07 (0.02–0.25)	< .001
None vs perio	0.15 (0.04–0.51)	.002
Age (y)		
35 to 44 vs 25 to 34	1.04 (0.51–2.10)	.915
45 to 54 vs 25 to 34	1.17 (0.57–2.41)	.671
55 to 70 vs 25 to 34	0.65 (0.31–1.39)	.271

OR = odds ratio; CI = confidence interval; pros = prosthodontics; perio = periodontics.

Table 2a Responses to Clinical Situation 1 (Fig 1a) (%)*

	All	Women	Men
Extraction of tooth 16 and fixed dental prosthesis 15–17	3.8	2.4	3.8
Resective periodontal surgery, tooth 16	20.7	17.9	22.2
Regenerative periodontal surgery, tooth 16	40.6	47.2	35.8 [†]
Extraction of tooth 16 and immedi- ate implant placement	3.7	4.9	3.3
Extraction of tooth 16, possibly later bone augmentation (single- or two- staged) and implant placement	31.2	27.6	34.9

*FDI tooth-numbering system.

[†]Significant differences between women and men (P < .05).

Fable 2b	Responses	to	Clinical	Situation	2	(Fig	1b) ([%])*
-----------------	-----------	----	----------	-----------	---	------	----	-----	-----	----

	All	Women	Men
Extraction of teeth 16 and 17, sinus grafting and implant placement area 15 and 16 (single- or two-staged)	4.8	2.5	5.8
Extraction of tooth 16, sinus graft- ing and implant placement area 15 and 16, tooth 17 maintained	61.6	65.8	58.8
Extraction of tooth 16, fixed dental prothesis with 14 and 17 as abutments	33.6	31.7	35.4

*FDI tooth-numbering system.

Table 2c	Responses to Clinic	cal Situation	3 (Fig	1c)	(%)*
----------	---------------------	---------------	--------	-----	------

	All	Women	Men
Fixed dental prosthesis with teeth 24 and 25 as abutments and a distal cantilever	17.4	19.5	16.0
Sinus grafting and implant place- ment area 26 (single- or two-staged)	50.3	52.0	50.5
No therapy	32.3	28.5	33.5

*FDI tooth-numbering system.

Table 2d Responses to Clinical Situation 4 (Fig 1d) (%)*

	All	Women	Men
Splinted crowns from tooth 13 to 23 with distal cantilevers (both sides)	12.6	13.2	11.4
Sinus grafting area tooth 14 to 16 and tooth 24 to 26, two implants on both sides (single- or two-staged)	58.4	55.4	61.1
Removable dental prosthesis	29.0	31.4	27.5

*FDI tooth-numbering system.

 $O_{\text{constructed}}$ and the $O_{\text{constructed}}$ O(2)

T I I A

Table 3 Com	ments on	the Statem						
Statements	All	Women	Men	P (Wald test)				
In patients with a history of periodontal disease, I prefer implant placement								
Yes	12.3	11.7	12.7	.937				
Don't know	17.4	20.0	15.1					
No	70.3	68.3	72.2					
Dental implants	have a be	etter progno	sis than I	natural teeth				
Yes	8.2	9.8	7.1	.349				
Don't know	6.3	8.9	6.2					
No	85.5	81.3	86.7					
When sinus gra teeth if these ha	fting is pla ave a ques	inned, I pref stionable pro	er to extr ognosis	act adjacent				
Yes	23.0	19.7	26.0	.379				
Don't know	34.9	38.5	31.7					
No	42.1	41.8	42.3					
Instead of comp molars, I prefer	olicated ro implant pl	ot canal tre lacement	atment ir	ı maxillary				
Yes	11.4	9.8	12.4	.512				
Don't know	5.1	5.8	4.3					
No	83.5	84.4	83.3					
For single-tooth region, I prefer even with little	For single-tooth replacement in the maxillary posterior region, I prefer implants over fixed dental prostheses, even with little residual bone volume							
Yes	35.0	34.4	36.5	.984				
Don't know	17.9	20.5	18.9					
No	47.1	45.1	47.6					
For edentulous spaces with two missing teeth, I prefer implants over fixed dental prostheses, even with little residual bone volume								
Yes	33.8	27.6	34.4	.131				

19.7

46.5

18.7

53.7

20.6

45.0

Section Four

Don't know

No

The majority of both female and male practitioners disagreed with the first, second, and fourth statements (Table 3). Approximately one third of participants were indecisive about the third statement ("It is better to extract adjacent teeth with a questionable prognosis when sinus grafting is planned"). Almost half of the female and male respondents disagreed with the fifth statement that implants are preferable to a fixed dental prosthesis (even with little residual bone volume) for single-tooth replacement in the maxillary posterior region. No differences between women and men were demonstrated for any of these opinions.

Discussion

The survey evaluated the attitudes of female and male practitioners to treatment decisions in the maxillary molar region and tested the hypothesis that women would prefer less invasive interventions. Only small variations were observed for treatment recommendations and assessments of the correctness of the different general statements. This indicates respondents' similar knowledge and decision making irrespective of sex. Implant placement, sinus grafting, and periodontal surgery were less frequently included in female clinicians' repertoires, and more women referred patients to specialists.

The number of women entering health professions is increasing. It is thus important to find out how their practice characteristics and services differ, if at all, from those of men. In dentistry and medicine, women currently make up roughly two thirds of those entering the first year of their undergraduate program. In Germany, the overall proportion of female clinicians was estimated to be 42% in 2010.14 According to the Swiss Dental Society,¹⁵ almost 26% of Swiss dentists in 2009 were women, with proportionally more women than men among the young members (26 to 31 years). For those aged 32 to 38 years, the distribution was more or less equal, whereas most of those older than 38 years were male. The representation of women in this study thus seems to be comparable with the gender distributions reported in Germany and Switzerland.

A comparatively high proportion of women in the younger age groups is well documented in the recent literature. In a random sample of Australian dentists, the percentage of female respondents was 19%, with most in the age cohorts 25 to 29 years (32%) and 30 to 34 years (21%), while the age distribution of men was more evenly spread.¹⁶ In a survey including all practicing dentists in Ontario, Canada, almost half of female clinicians (49%) were within the age group 30 to 39 years, 20% were 20 to 29 years, 21% were 40 to 49 years, and only 10% were \geq 50 years, while men were generally older, with only 7% aged 20 to 29 years but 26% older than 50.17 Within this Canadian sample, more men (13%) than women (7%) were specialists. In the current study, the percentage of specialists among women (44%) was close to that of men (48%), but female clinicians tended to prefer orthodontics, endodontics, and pediatric dentistry (classified as "other"), while slightly more men had specialized in periodontology or reconstructive dentistry (prosthodontics). This observation is in accordance with reports from the United States, where over half of those enrolled in postgraduate pediatric dentistry

The International Journal of Prosthodontics

© 2011 BY QUINTESSENCE PUBLISHING CO, INC. PRINTING OF THIS DOCUMENT IS RESTRICTED TO PERSONAL USE ONLY.. NO PART OF MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM WITHOUT WRITTEN PERMISSION FROM THE PUBLISHER

programs since 1990 have been women.¹⁸ In this survey, more men than women were in private practice and practice owners, and a similar pattern has also been reported in New Zealand and the United States.^{9,19} The authors found that a slightly larger proportion of female practitioners were working in clinics compared to men, while similar proportions were working on their own. However, according to the 2009 data from the Swiss Society of Odontology, only 19.6% of practice owners were women (ie, 63% of women), while 90% of men owned their practices.¹⁵ Since female practitioners are much more likely than men to prefer part-time associate status,^{20,21} there may well be a shortage of practitioners in the future. This is a serious concern, which should be addressed by increasing the number of training locations.

In this survey, women less frequently included implant placement, sinus grafting, and periodontal surgery in their repertoires than men, and were more likely to refer patients. The choice of specialty among women preferring orthodontics, endodontics, and pediatric dentistry ("other") possibly explains why they report a lower prevalence of surgical therapies including implant placement. This factor (other vs periodontal specialty) was identified as a predictor in the regression analysis for implant placement and for periodontal surgeries. The subgroup with other specialties, however, comprised only 17.9% of all female and 12.7% of all male participants. Among those placing implants, the frequencies per year were smaller among female practitioners, which is either related to different preferences or to the more prevalent part-time associate status in women. Unfortunately, respondents' practice hours per week were not included in the current investigation, so it was not feasible to correct for parttime practice. Thus, the lower frequencies reported for women must be interpreted with caution. A survey of German practitioners similarly found that only 30% of women reported implant dentistry as a focus compared to 57% of men. Women, in particular, preferred pediatric dentistry, prophylaxis, and prevention, while men tended to focus on dental implants and reconstructive dentistry (prosthodontics).²² A survey of clinicians in the United States⁹ also found that female practitioners were more likely to refer patients to specialists than male clinicians. Specifically, women were more likely to refer large multiunit fixed cases, crowns, fixed partial dentures, endodontics, and surgical extractions, whereas men reported providing more periodontal surgery, extractions, and implants.⁹

Women favored regenerative periodontal surgery over resective surgery or extraction of the maxillary molar with through-and-through furcation involvement (degree III, Fig 1a). They were either not aware of

recent evidence that regenerative measures are only indicated for maxillary molars with furcation involvement degree II (horizontal loss of support exceeding 3 mm)²³ or the therapeutic decision was related to their efforts to keep the dentition closed, since previous tooth loss predicts further tooth loss.24,25 Another aspect is that psychologic and emotional factors often play an important role in decision making and prevail over evidence from clinical trials. This has been documented in the medical field, eg, for percutaneous coronary interventions in patients with stable coronary artery diseases.²⁶ While the number of women practicing medicine has increased, female practitioners still tend to be underrepresented in medical and surgical specialties.⁴ Women are more likely to work as general practitioners or choose specialties that are more care-giving and less technical.²¹ Thus, a so-called feminization shift may be occurring in the health care system,³ with female practitioners more likely to use a more humanistic and patient-centered approach.2,21

Some of the general statements were apparently not correct (1 and 2), while there is no clear reason for rejecting statements 3 (extraction of adjacent questionable teeth before sinus grafting) and 4 (implant preference over complicated endodontics). Irrespective of the correctness of these statements, a distinct proportion of the participants (women and men) were noncommittal about statements 1 (implants in patients with previous periodontal disease) and 3. From a patient's perspective, the choice of care provider, particularly in terms of specialty and age, is known to determine, at least in part, whether or not a tooth will be maintained or extracted and replaced by an implant.13 The current survey, however, clearly revealed only minor gender differences in respondents' overall expert knowledge and similar treatment decisions irrespective of sex. While the majority of male respondents reported that they also performed complex therapies themselves, women were more likely to refer patients to specialists. Because of these differences and the increasing number of female practitioners in the dental field, possible gender preferences in clinicians' decision making should be further investigated.

Conclusion

With an increasing number of women entering the dental health care profession, the current questionnaire aimed at investigating potential differences in practice characteristics and services among male and female practitioners. Obvious gender differences existed in the clinical repertoire, with surgical procedures being more frequently performed among men while female practitioners tended to refer more patients to specialists; only few women selected prosthodontics as a specialty. Apart from a preference for regenerative periodontal surgery among women, no gender differences were observed for treatment decisions in the posterior maxillary region. With analogous practitioner attitudes and views on general statements among men and women, a similar overall expert knowledge is ascertained irrespective of gender.

Acknowledgments

The authors are grateful to U. Simmen and A. Schötzau (Statisticians, Basel) for performing the statistical analysis, V. Laederach for thoroughly examining the questionnaires, PD Dr S. Scherer (University of Geneva) for translating the questionnaire into French, and Dr Silvia Dingwall for proofreading the English manuscript.

References

- Maheux B, Dufort F, Lambert J, Lévesque A. The professional attitudes and practice characteristics of male and female specialists. J Am Med Womens Assoc 1989;44:154–158.
- Roter DL, Hall JA, Aoki Y. Physician gender effects in medical communication: A meta-analytic review. JAMA 2002;288: 756–764.
- Thomas RK. The feminization of American medicine. Mark Health Serv 2000;20:12–18.
- Clark P, Martinez H, Ryan G, Barile L. Does being a woman make a difference in professional practice? A qualitative view to the practice of rheumatology. J Rheumatol 2000;27:2010–2017.
- Hershman DL, Buono D, Jacobson JS, et al. Surgeon characteristics and use of breast conservation surgery in women with early stage breast cancer. Ann Surg 2009;249:828–833.
- Ioannidis G, Papaioannou A, Thabane L, et al. Family physicians' personal and practice characteristics that are associated with improved utilization of bone mineral density testing and osteoporosis medication prescribing. Popul Health Manag 2009; 12:131–138.
- Baumhäkel M, Müller U, Böhm M. Influence of gender of physicians and patients on guideline-recommended treatment of chronic heart failure in a cross-sectional study. Eur J Heart Fail 2009;11:299–303.
- Debate RD, Vogel E, Tedesco LA, Neff JA. Sex differences among dentists regarding eating disorders and secondary prevention practices. J Am Dent Assoc 2006;137:773–781.
- Atchison KA, Bibb CA, Lefever KH, Mito RS, Lin S, Engelhardt R. Gender differences in career and practice patterns of PGDtrained dentists. J Dent Educ 2002;66:1358–1367.
- Kronström M, Palmqvist S, Söderfeldt B. Prosthodontic decision making among general dentists in Sweden. II: The choice between fixed and removable partial dentures. Int J Prosthodont 1999;12:527–533.

- Kronström M, Palmqvist S, Söderfeldt B, Carlsson GE. Dentistrelated factors influencing the amount of prosthodontic treatment provided. Community Dent Oral Epidemiol 2000; 28:185–194.
- Walter C, Weiger R, Zitzmann NU. Periodontal surgery in furcation-involved maxillary molars revisited—An introduction of guidelines for comprehensive treatment. Clin Oral Investig 2011;15:9–20.
- Zitzmann NU, Scherrer SS, Weiger R, Lang NP, Walter C. Preferences of dental care providers in maintaining compromised teeth in relation to their professional status: Implants instead of periodontally involved maxillary molars? Clin Oral Implants Res 2011;22:143–150.
- Bundeszahnärztekammer. Statistisches Jahrbuch der Bundeszahnärztekammer 2008/2009. Arbeitsgemeinschaft der deutschen Zahnärztekammern eV, Berlin 2009. www. bzaek.de. Accessed 1 Oct 2010.
- Schweizerische Zahnärzte-Gesellschaft. www.sso.ch. 2009. Accessed 1 Oct 2010.
- Brennan DS, Spencer AJ, Szuster FS. Insurance status and provision of dental services in Australian private general practice. Community Dent Oral Epidemiol 1997;25:423–428.
- McCarthy GM, MacDonald JK. Gender differences in characteristics, infection control practices, knowledge and attitudes related to HIV among Ontario dentists. Community Dent Oral Epidemiol 1996;24:412–415.
- Solomon ES, Hayes MJ. Gender and the transition into practice. J Dent Educ 1995;59:836–840.
- Ayers KM, Thomson WM, Rich AM, Newton JT. Gender differences in dentists' working practices and job satisfaction. J Dent 2008;36:343–350.
- Roberts MW, Seale NS, Lieff S. Career preferences of pediatric dentistry advanced education students. Pediatr Dent 1997; 19:104–108.
- Williams AP, Pierre KD, Vayda E. Women in medicine: Toward a conceptual understanding of the potential for change. J Am Med Womens Assoc 1993;48:115–121.
- Micheelis W, Bergmann-Krauss B, Reich E. Rollenverständnisse von Zahnärztinnen und Zahnärzten in Deutschland zur eigenen Berufsausübung. www.idz-koeln.de 2010;IDZ ANFO-Z. Accessed 1 Oct 2010.
- Jepsen S, Eberhard J, Herrera D, Needleman I. A systematic review of guided tissue regeneration for periodontal furcation defects. What is the effect of guided tissue regeneration compared with surgical debridement in the treatment of furcation defects? J Clin Periodontol 2002;29(suppl 3):103–116.
- Burt BA, Ismail AI, Morrison EC, Beltran ED. Risk factors for tooth loss over a 28-year period. J Dent Res 1990;69:1126–1130.
- Caplan DJ, Kolker J, Rivera EM, Walton RE. Relationship between number of proximal contacts and survival of root canal treated teeth. Int Endod J 2002;35:193–199.
- Lin GA, Dudley RA, Redberg RF. Why physicians favor use of percutaneous coronary intervention to medical therapy: A focus group study. J Gen Intern Med 2008;23:1458–1463.

© 2011 BY QUINTESSENCE PUBLISHING CO, INC. PRINTING OF THIS DOCUMENT IS RESTRICTED TO PERSONAL USE ONLY.. NO PART OF MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM WITHOUT WRITTEN PERMISSION FROM THE PUBLISHER Copyright of International Journal of Prosthodontics is the property of Quintessence Publishing Company Inc. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.