

# Exploring furcation involvement diagnosis and treatment practices: a cross-sectional survey among general dentists in southern Santa Fe Province, Argentina

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## ABSTRACT

The risk of losing a tooth with furcation involvement is twice as high as that of losing a multirrooted tooth with good periodontal status. Early diagnosis of furcation involvement increases the likelihood of retaining the tooth in the oral cavity. **Aim:** To explore the behavior and limitations of general dentists in the southern region of Santa Fe Province in the detection and clinical management of furcation lesions. **Materials and Method:** A cross-sectional study was conducted using an anonymous online questionnaire consisting of 32 questions to assess general dentists' experience in diagnosis and management of furcation lesions (instrumental, classification and treatment), how likely they were to refer patients, and their self-perception regarding certain topics. Invitations to participate were extended twice between November 2022 and March 2023 via email sent by the Dental Association of the 2nd District of Santa Fe Province. The invitation emails contained a link to the questionnaire on the Google Forms platform, which participants accessed after reading the information sheet and providing informed consent to participate. Once the survey was completed, the responses were exported as a matrix from the Google Forms platform and anonymized. **Results:** Most of the 121 surveyed dental professionals reported difficulties with diagnosis, limitations in handling instruments, and challenges in selecting appropriate treatments. **Conclusions:** As reported by similar studies in other countries, there is a clear need for further training and development of continuous education programs for general dentists in the region.

**Key words:** diagnosis - furcation involvement - periodontitis - treatment - dentists - professional training

## To cite:

Llaudet JC, Pussetto E, Carrion M, De la Vega Elena CD, Herrero F. Exploring furcation involvement diagnosis and treatment practices: a cross-sectional survey among general dentists in southern Santa Fe Province, Argentina. *Acta Odontol Latinoam*. 2024 Dec 30;37(3):227-236. <https://doi.org/10.54589/aol.37/3/227>

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Received: March 2024.

Accepted: October 2024.



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## Diagnóstico y tratamiento de lesiones de furcación: una encuesta entre odontólogos generales del sur de la provincia de Santa Fe, Argentina

## RESUMEN

Una pieza dentaria con lesión de furcación duplicaría el riesgo de pérdida en comparación con otro diente multirradicular con un buen estado periodontal. El diagnóstico temprano de una lesión de furcación aumenta la permanencia de la pieza dentaria en la cavidad oral. **Objetivo:** Explorar el comportamiento y las limitaciones de los odontólogos generales del sur de la Provincia de Santa Fe en la detección y manejo clínico de las lesiones de furcación. **Materiales y Método:** Se realizó un estudio transversal utilizando un cuestionario anónimo en línea compuesto por 32 preguntas para investigar la experiencia de los profesionales odontólogos en cuanto al diagnóstico y tratamiento de las lesiones de furcación. También se relevó las posibilidades de derivación y la autopercepción de los profesionales respecto a los problemas planteados. Los profesionales fueron invitados a participar dos veces entre noviembre de 2022 y marzo de 2023 a través de correo electrónico enviado por el Colegio de Odontólogos de la 2da. Circunscripción de la Provincia de Santa Fe. Los correos de invitación contenían un enlace al cuestionario en la plataforma Google Forms, al que los participantes accedían después de leer la hoja informativa y proporcionar su consentimiento explícito para participar (consentimiento informado). Una vez completado el cuestionario, las respuestas se exportaron como matriz desde la plataforma Google Forms y se anonimizaron. **Resultados:** La mayoría de los 121 profesionales odontólogos encuestados mostraron dificultades diagnósticas, deficiencias en el manejo de instrumentos y desafíos en la elección del tratamiento. **Conclusiones:** Como se ha informado en estudios similares en otros países, queda evidente la necesidad de mayor capacitación y desarrollo de programas de educación continua para los odontólogos generales en la región.

**Palabras clave:** diagnóstico - lesión de furcación - periodontitis - tratamiento - odontólogos - formación profesional

## INTRODUCTION

Furcation involvement occurs when alveolar bone resorption extends to the bifurcation or trifurcation areas of a multirrooted tooth due to periodontal disease<sup>1</sup>. Current classifications commonly used for furcation lesions include the measurement of horizontal extension<sup>2</sup>, vertical measurement<sup>3</sup>, and categorization based on clinical and radiographic parameters<sup>4</sup>.

The presence of furcation involvement is associated with an increased risk of tooth loss, both in patients under supportive periodontal therapy<sup>5-10</sup> and in patients without periodontal therapy<sup>11</sup>. As a complexity factor, furcation lesions class II and III determine the stage of periodontitis according to the 2018 classification of periodontal diseases<sup>12</sup>. Therefore, adequate diagnosis is unlikely without complete probing of furcation lesions.

Although there is sufficient evidence regarding the best treatment options for furcation involvement at all stages, the best prognosis is achieved through prevention and early detection. An untreated grade I furcation lesion will progress and require more complex treatment<sup>11</sup>, but adequate diagnosis and treatment will reduce the risk of tooth loss<sup>10,13</sup>. A grade II-III furcation lesion requires more complex treatment to minimize the risk of tooth loss<sup>14-16</sup>.

Currently, furcation lesions are significantly underdiagnosed in primary care<sup>17</sup>. In Argentina there is no information available on the detection and clinical management of furcation involvement by general dentists, nor on the potential need to improve education and continuous professional development.

The aim of this study was to explore the behavior and limitations of general dentists in the southern region of Santa Fe Province in the detection and clinical management of furcation lesions.

## MATERIALS AND METHOD

### Study Design

This was an observational, online survey-based, cross-sectional study with prospective data collection.

### Population

The study population consisted of general dentists practicing in the southern region of Santa Fe Province.

Inclusion criteria were dentists registered with the Dental Association of the 2nd District of Santa Fe Province at the time of the study, and practicing in one of the following departments in the province: Rosario, Caseros, Constitución, Iriondo, San Lorenzo, General López or Belgrano. Dentists specialized in periodontics were excluded from the study.

### Recruitment

Invitations to participate were e-mailed twice between November 2022 and March 2023 by the Dental Association of the 2nd District of Santa Fe Province. They contained a link to the Google Forms questionnaire, which participants accessed after reading the information sheet and providing informed consent.

### Questionnaire

The questionnaire comprised 32 questions (Table 1) covering: a) Clinical diagnosis of furcation involvement, b) Radiographic diagnosis of furcation involvement, c) Perception of prognosis of these lesions, d) Treatment management of these lesions, and e) Need to update knowledge on the topic. It was based on a questionnaire published previously by Nibali et al.<sup>17</sup> with modifications and additional questions. Once the established data collection period concluded, the questionnaires were exported as a matrix from Google Forms and anonymized.

Statistical Analysis: Descriptive statistics were performed using IBM SPSS Statistics software (version 25).

### Ethical Considerations

This study was approved by the Institutional Committee of Ethics and Bioethics (Res. CEB IUNIR No. 44/22 dated November 29, 2022). Participation was voluntary and anonymous. Precise information was provided about the research and its objectives, and prior consent was obtained before the respondents accessed the online Google Forms questionnaire. Project members signed a confidentiality agreement.

The study followed the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) checklist for cross-sectional studies.

**Table 1. Self-administered questionnaire provided to general dentists in the south of the Province of Santa Fe, regarding their behavior and limitations in the diagnosis and management of furcation lesions.**

<b>A. Demographics and General Information of Survey Participants</b>	
Question	Options
A1. Gender	<input type="checkbox"/> Female <input type="checkbox"/> Male <input type="checkbox"/> Other
A2. Age	<input type="checkbox"/>
A3. Department of the 2nd Circumscription of the Province of Santa Fe where you work	<input type="checkbox"/> Belgrano <input type="checkbox"/> Caseros <input type="checkbox"/> Constitución <input type="checkbox"/> General López <input type="checkbox"/> Iriondo <input type="checkbox"/> Rosario <input type="checkbox"/> San Lorenzo
A4. Professional setting	<input type="checkbox"/> Works in the private sector <input type="checkbox"/> Works for the Public Service <input type="checkbox"/> Works for both the Public Service and in the private sector
A5. University of Graduation (Undergraduate)	<input type="checkbox"/>
A6. Year of Graduation as a Dentist	<input type="checkbox"/>
A7. Do you have postgraduate degree(s)?	<input type="checkbox"/> No <input type="checkbox"/> Yes. If yes, please specify: <input type="checkbox"/>
<b>B. Routine Practices</b>	
B1. How many periodontal patients do you estimate you treat per week?	<input type="checkbox"/> <5 <input type="checkbox"/> 5 to 10 <input type="checkbox"/> 11 to 20 <input type="checkbox"/> >20
B2. How many patients do you refer to a specialist per week?	<input type="checkbox"/> <5 <input type="checkbox"/> 5 to 10 <input type="checkbox"/> 11 to 20 <input type="checkbox"/> >20
B3. In your daily practice, do you have access to the Nabers Probe?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Maybe
B4. How often do you use the Nabers probe?	<input type="checkbox"/> On every patient <input type="checkbox"/> On most patients <input type="checkbox"/> Only on patients with advanced periodontitis <input type="checkbox"/> Never
B5. In your daily practice, do you have access to periodontal probes?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
B6. How often do you use periodontal probes?	<input type="checkbox"/> On every patient <input type="checkbox"/> On most patients <input type="checkbox"/> Only on patients with advanced periodontitis <input type="checkbox"/> Never
B7. When performing a periodontal probing, how many sites do you evaluate per tooth?	<input type="checkbox"/> 2 <input type="checkbox"/> 4 <input type="checkbox"/> 6 <input type="checkbox"/> I never perform probing
B8. How many cases of furcation lesions have you treated with periodontal surgery throughout your professional life?	<input type="checkbox"/> None <input type="checkbox"/> 1 to 10 <input type="checkbox"/> 11 to 50 <input type="checkbox"/> > 50
<b>C. Experience Report</b>	
C1. Flap access periodontal surgery	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5
C2. Regenerative periodontal surgery	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5
C3. Root resection surgery	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5
C4. Implant surgery	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5
<b>D. Knowledge and Self-perception</b>	
D1. Do you think there is furcation involvement in this case? (image)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
D2. Do you think there is furcation involvement in these first molars? (image)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
D3. Do you think there is furcation involvement in these first molars? (image)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
D4. Do you think there is furcation involvement in these first molars? (image)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
D5. Do you believe the furcation lesion affects dental prognosis? (image)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure
D6. How would you manage a case of advanced furcation as shown in the following radiograph (both affected molars)?	<input type="checkbox"/> Would treat <input type="checkbox"/> Would refer to a specialist <input type="checkbox"/> Would not treat
D7. How confident are you that this tooth can be maintained functional for at least 5 years? (image)	(1) No confidence (2) Low confidence (3) Medium confidence (4) High confidence (5) Very high confidence
D8. How confident are you in detecting furcation lesions?	(1) No confidence (2) Low confidence (3) Medium confidence (4) High confidence (5) Very high confidence
D9. How confident are you in knowing how to manage furcation lesions?	(1) No confidence (2) Low confidence (3) Medium confidence (4) High confidence (5) Very high confidence

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<b>Table 1. (cont.)</b>	
D11. Do you think an implant would have a higher survival rate than a tooth with furcation involvement in a periodontally stable patient?	( ) Yes ( ) No ( ) Not sure
D12. What are the main challenges you face when treating a furcation lesion? Check all that apply.	( ) Lack of time ( ) Lack of adequate instruments ( ) Lack of experience in detection and classification of furcation lesions ( ) Lack of knowledge about referral and management protocols ( ) Other
<b>E. Interest in Continuous Education</b>	
E1. Are you interested in learning more about detection, classification, and management of furcation lesions?	( ) Yes ( ) No ( ) Not sure
E2. How would you like to learn more about furcation lesions? Check all that apply.	( ) Theoretical course with in-person mode ( ) Theoretical course with virtual mode ( ) Theoretical-Practical course (Workshop) ( ) Theoretical-Practical course (Clinical)

## RESULTS

A total of 121 complete surveys that met the selection criteria were analyzed.

<b>Table 2. Demographics and general information of survey participants</b>		
<b>Sex</b>	<b>N</b>	<b>%</b>
Female	64	52.9
Male	57	47.1
Total	121	100.0
<b>Age</b>		
21-30 years	6	5.0
31-40 years	28	23.1
41-50 years	47	38.8
51-60 years	31	25.6
>60 years	9	7.4
Total	121	100.0
<b>Department in Santa Fe Province</b>		
Belgrano	3	2.5
Caseros	4	3.3
Constitución	10	8.3
General López	6	5.0
Iriondo	1	0.8
Rosario	83	68.6
San Lorenzo	14	11.6
Total	121	100.0
<b>Professional setting</b>		
General Dentist in Private Sector	78	64.5
General Dentist in Public Service	2	1.7
General Dentist in Public Service and Private Sector	36	29.8
Missing Data	5	4.1
Total	121	100.0

<b>Table 2. (cont.)</b>		
<b>University of Graduation</b>		
Instituto Universitario Italiano de Rosario	5	4.1
Universidad de Buenos Aires	1	0.8
Universidad Nacional de Córdoba	2	1.7
Universidad Nacional del Litoral	1	0.8
Universidad Nacional de Rosario	111	91.7
Universidad Nacional de Tucumán	1	0.8
Total	121	100.0
<b>Year of Graduation (Dentist)</b>		
1966-1981	6	5.0
1981-1996	30	24.8
1996-2011	60	49.5
2011-2024	25	20.7
Total	121	100.0
<b>Postgraduate Degree/s</b>		
No	71	58.7
Yes	50	41.3
Total	121	100.0

### Surveyed Population

Most of the surveyed dentists reported practicing in the Departments of Rosario and San Lorenzo. Of the surveyed professionals, 52.9% were female and 47.1% were male, with ages ranging from 26 to 73 years. Regarding professional development, 64.5% worked in the private sector, 29.8% worked in both the public and private sectors, and 1.7% worked exclusively for the public sector. Nearly all respondents graduated from the School of Dentistry

of Universidad Nacional de Rosario (UNR), with a smaller percentage graduating from the School of Dentistry of Instituto Universitario Italiano de Rosario (IUNIR) and Universidad Nacional de Córdoba (UNC), mostly between 1999 and 2010. Only 41.3% reported having a postgraduate degree (Table 2).

**Experience in Periodontal Treatment**

Among the respondents, 46.3% reported treating fewer than 5 periodontal patients per week, while 41.3% treated 5 to 10 patients per week. A smaller proportion treated 11 to 20 patients, and even fewer treated more than 20 patients weekly. Regarding periodontal probes, only 51.2% reported having access to a Nabers probe, with 85% using it only on periodontal patients (Tables 3 and 4).

B1. How many periodontal patients do you estimate you treat per week?	N	%
<5	56	46.3
5 to 10	50	41.3
11 to 20	12	9.9
>20	3	2.5
Total	121	100.0
B2. How many patients do you refer to a specialist per week?		
<5	100	82.6
5 to 10	19	15.7
11 to 20	1	0.8
>20	1	0.8
Total	121	100.0
B3. In your daily practice, do you have access to a Nabers probe?		
Yes	62	51.2
No	53	43.8
Maybe	6	5.0
Total	121	100.0
B4. How often do you use a Nabers probe?		
On every patient	2	1.7
On most patients	9	7.4
Only on patients with advanced periodontitis	50	41.3
Never	60	49.6
Total	121	100.0
B5. In your daily practice, do you have access to periodontal probes?		
Yes	115	95.0

No	6	5.0
Total	121	100.0
B6. How often do you use periodontal probes?		
On every patient	14	11.6
On most patients	48	39.7
Only on patients with advanced periodontitis	45	37.2
Never	14	11.6
Total	121	100.0
B7. When performing a periodontal probing, how many sites do you evaluate per tooth?		
0	9	7.4
2	29	24.0
4	63	52.1
6	20	16.5
Total	121	100.0
B8. How many cases of furcation lesions have you treated with periodontal surgery throughout your professional life?		
None	80	66.1
1 to 10	26	21.5
11 to 50	12	9.9
> 50	3	2.5
Total	121	100.0

Periodontal probes were available to 95%, but only 11.6% used them on all patients.

Concerning the number of sites evaluated per tooth, only 16.5% evaluated them correctly (at 6 sites), while the rest had deficiencies.

Two-dimensional radiographic images were used to assess ability to detect presence or absence of furcation involvement in molars. Three different cases were presented: in Case 1 (Fig. 1), only 9.9% expressed uncertainty regarding the presence of furcation involvement in the molar; in Case 2 (Fig. 2), 23.1%; and in Case 3 (Fig. 3), 15%. The remaining participants provided either positive or negative responses. The divergent answers suggest that diagnosis based solely on two-dimensional radiographic images does not provide certainty regarding the presence or absence of furcation lesions.

Procedure / Experience Level	N	%
<b>C1. Periodontal flap surgery</b>		
No experience	70	57.9%
Low experience	19	15.7%
Medium experience	15	12.4%
High experience	12	9.9%
Very high experience	5	4.1%
Total	121	100.0%
<b>C2. Regenerative periodontal surgery</b>		
No experience	80	66.1%
Low experience	16	13.2%
Medium experience	14	11.6%
High experience	11	9.1%
Very high experience	0	0%
Total	121	100.0%
<b>C3. Root resection surgery</b>		
No experience	72	59.5%
Low experience	20	16.5%
Medium experience	15	12.4%
High experience	11	9.1%
Very high experience	3	2.5%
Total	121	100.0%
<b>C4. Implant surgery</b>		
No experience	58	47.9%
Low experience	12	9.9%
Medium experience	17	14.1%
High experience	24	19.8%
Very high experience	10	8.3%
Total	121	100.0%

Question	N	%
<b>D1. Do you think there is furcation involvement in this case? (image)</b>		
No	9	7.4%
Not sure	30	24.8%
Yes	82	67.8%
Total	121	100.0%
<b>D2. Do you think there is furcation involvement in these first molars? (image) (Case 1)</b>		
No	6	5.0%
Not sure	12	9.9%
Yes	103	85.1%
Total	121	100.0%
<b>D3. Do you think there is furcation involvement in these first molars? (image) (Case 2)</b>		
No	76	62.8%

Not sure	28	23.1%
Yes	17	14.0%
Total	121	100.0%
<b>D4. Do you think there is furcation involvement in these first molars? (image) (Case 3)</b>		
No	33	27.3%
Not sure	18	14.9%
Yes	70	57.9%
Total	121	100.0%
<b>D5. Do you think furcation involvement affects dental prognosis? (image)</b>		
No	1	0.8%
Not sure	3	2.5%
Yes	117	96.7%
Total	121	100.0%
<b>D6. How would you manage a case of advanced furcation as in in the following X-ray (both affected molars)?</b>		
Would refer to a specialist	87	71.9%
Would treat	34	28.1%
Total	121	100.0%
<b>D7. How confident are you that this tooth can remain functional for at least 5 years? (image)</b>		
No confidence	23	19.0%
Low confidence	36	29.8%
Medium confidence	42	34.7%
High confidence	17	14.0%
Very high confidence	3	2.5%
Total	121	100.0%
<b>D8. How confident do you feel when detecting furcation lesions?</b>		
No confidence	5	4.1%
Low confidence	23	19.0%
Medium confidence	55	45.5%
High confidence	30	24.8%
Very high confidence	8	6.6%
Total	121	100.0%
<b>D9. How confident do you feel about knowing how to manage furcation lesions?</b>		
No confidence	28	23.1%
Low confidence	44	36.4%
Medium confidence	34	28.1%
High confidence	14	11.6%
Very high confidence	1	0.8%
Total	121	100.0%



**Table 5. (cont.)**

D10. Do you think an implant would have higher survival rate than a tooth with furcation involvement in a periodontally stable patient?		
No	52	43.0%
Not sure	44	36.4%
Yes	25	20.7%
Total	121	100.0%
D11. What do you believe are the major challenges you face when dealing with a furcation involvement? Check all that apply.		
Lack of experience in detection and classification of furcation lesions	67	55.4%
Unfamiliarity with referral and management protocols	42	34.7%
Lack of appropriate instruments	33	27.3%
Lack of time	14	11.6%
Poor patient response to oral care techniques	6	5.0%
Not a periodontal specialist	2	1.7%
Patient's time and ability to cover costs	1	0.8%
Root anatomy	1	0.8%
Total	121	

### Perception of Prognosis in Teeth with Furcation Lesions

A high percentage (96.7%) agreed that furcation lesions affect the survival of multirooted teeth.

### Confidence in Detection and Management of Furcation Lesions

When presented with a case of furcation lesion in two molars, only 28.1% of respondents stated they would treat them, while 71.9% would refer them to a periodontal specialist (Table 5). These percentages are consistent with the answers regarding the difficulty general dentists encounter in managing this type of lesions (Fig. 4).

However, when asked whether a molar with a furcation lesion, treated and preserved in the mouth, would have a higher survival rate than if it were extracted and replaced with an implant, 43% answered in favor of treating the molar versus 20.7% who opted for replacement with an implant. These responses indicate that although dentists consider these lesions clinically challenging to manage, they prioritize treatment over extraction and implant placement.

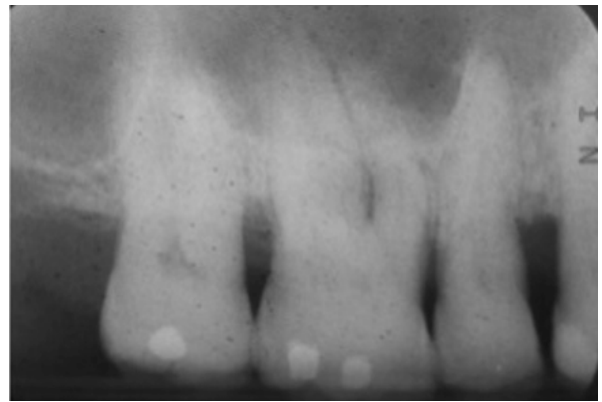


Fig. 1: Case 1. Teeth 16 and 17.

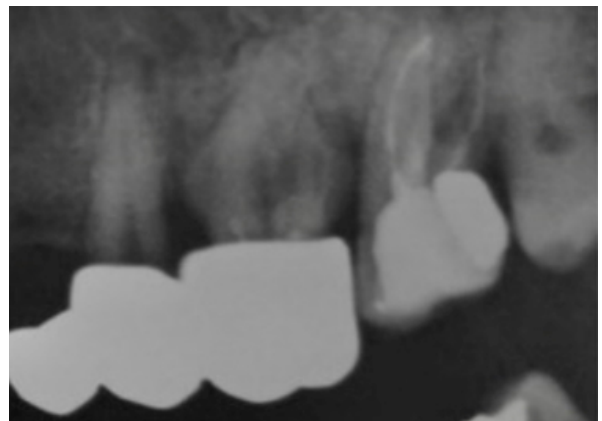


Fig. 2: Case 2. Teeth 26 and 27.



Fig. 3: Case 3. Tooth 36.



Fig. 4: Case 4. Teeth 16 and 17.

## Barriers to Dealing with Furcation Lesions and Ways to Improve Them

A significant proportion (55.4%) of respondents said they had difficulties in diagnosing and treating furcation lesions. Nonetheless, 72.7% expressed interest in learning more about the detection, classification, and management of furcation lesions (Table 6).

E1. Are you interested in learning more about detection, classification, and management of furcation involvement?	N	%
No	17	14.0%
Not sure	16	13.2%
Yes	88	72.7%
Total	121	100.0%
E2. How would you like to learn more about furcation lesions? Check all that apply.		
Theoretical course with in-person mode	15	12.4%
Theoretical course with virtual mode	38	31.4%
Theoretical-Practical course (Clinical)	36	29.8%
Theoretical-Practical course (Workshop)	32	26.4%
Total	121	100.0%

## DISCUSSION

This is the first study in Argentina using a survey format to analyze general dentists' knowledge of diagnosis and management of furcation involvement. The analysis considered the new Classification of Periodontal Diseases presented in 2018, which was defined in the 2017 Workshop by Tonetti et al.<sup>12</sup>, and the current classifications for furcation involvement, including those by Hamp et al.<sup>2</sup> and Tarnow et al.<sup>3</sup>. A correct understanding of terminology is essential to be applied to each unit of analysis<sup>1</sup>.

Clinical diagnosis of periodontal pathologies requires the use of a probe (Marquis/North Carolina), and specifically, Nabers probes are used for furcation lesions<sup>8,10</sup>. In this study, most dentists were aware of them, but only a low proportion used them on all patients. In contrast, only half had access to Nabers probes and used them in their daily practice. Not knowing about and/or not using Nabers probes make it difficult to diagnose furcation lesions. The percentages recorded in the current study were similar to those found recently by Nibali et al.<sup>17</sup> among dentists from different countries.

Only a few dentists reported correct use of periodontal probes, i.e., on six sites per tooth<sup>18</sup>. Incorrect use makes it difficult to establish a definitive diagnosis, as periodontal lesions cannot be identified if the probe is not used at all sites of each tooth. Similarly, furcation lesions cannot be diagnosed if the probe is not placed in each furcal entrance in premolars and molars. Appropriate treatment can only be planned based on suitable diagnostic practice<sup>2,3</sup>.

Most respondents said they treated a significant number of patients (though not more than 10) with periodontal pathologies per week.

These results show that general dentists encounter a high degree of difficulty in identifying and making a definitive diagnosis of periodontal lesions, especially in patients with severe periodontitis (stages III and IV). When furcation lesions remain undiagnosed, treatment is neither planned nor executed correctly. Furthermore, current criteria propose that different periodontal pathologies (gingivitis and periodontitis) should be diagnosed by general dentists, not only by specialists<sup>12</sup>, which was not found to be the case in this study. Sanz et al.<sup>14</sup>, Dommisch et al.<sup>15</sup> and Jepsen et al.<sup>16</sup>, believe that 70% of these pathologies can be treated by general dentists.

Respondents' answers regarding the diagnosis of upper and lower molars using two-dimensional periapical radiographs revealed difficulties in determining the presence of furcation lesions in all three clinical cases analyzed. This reflects (a) the limitation of periapical radiography as a single diagnostic method, which creates difficulty not only in identifying the furcation lesion but also in categorizing the type of furcation lesion based on current classifications, and (b) the difficulty encountered by general dentists in making a correct diagnosis through imaging alone, without clinical examination. The same limitation applies to specialists<sup>14</sup>.

However, nearly all respondents considered the impact of furcation lesions on the prognosis of affected teeth to be significant, demonstrating an awareness of the challenges associated with treating these lesions, and the risk they pose to tooth retention<sup>5</sup>. These results are similar to those reported for a group of specialists in a European study on general dentists and specialists<sup>10</sup>.

Another significant finding of the current study was that most professionals lacked confidence in effectively managing furcation lesions, and preferred



to refer cases of advanced furcation lesions (Hamp type 2/3) to periodontal specialists. However, when asked about whether an implant would offer better survival than a tooth affected by furcation involvement in a periodontally stable mouth, responses indicated preference for preserving the affected tooth rather than placing an implant.

A furcation lesion is not an absolute indication for extraction and despite the reserved prognosis, tooth survival with appropriate preventive protocols can range from 10 to 20 years or more<sup>6,7</sup>. The findings in the current study undoubtedly show lack of clarity in the clinical management of furcation lesions, and in the knowledge of treatment outcomes and prognosis, compared to an implant as a replacement for a tooth. It should be noted that replacing a tooth with an implant is more costly than treating a furcation lesion<sup>19</sup>.

Limitations in the acquisition of theoretical knowledge in undergraduate dental education significantly influence practice. As evidence-

based knowledge constitutes the foundation of professional diagnosis, treatment and preventive strategy planning, not only for furcation lesions, but also for oral health in general, the importance of updating it should be emphasized.

Another aim of this study was to assess general practitioners' need for updates in this field: a high proportion responded affirmatively regarding their need to update their knowledge of classification, detection and clinical management of furcation. There is a need to reinforce knowledge of current instruments, diagnosis, and management of periodontal diseases in general and furcation involvement in particular.

## CONCLUSION

The findings suggest the need for further education in the diagnosis and clinical management of periodontal diseases, as well as the implementation of continuous training programs for general dentists.

## ACKNOWLEDGMENTS

The authors thank the Dental Association of the Second Circumscription of Santa Fe Province, Argentina, for its institutional support, and Lic. Pablo Cottet for his invaluable assistance with the statistical analysis of this study.

## CONFLICT INTERESTS

The authors declare no potential conflicts of interest regarding the research, authorship, and/or publication of this article.

## FUNDING

This study was supported by a Grant from Instituto Universitario Italiano de Rosario, Grant Number CAI-O 01/22.

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