

## CONFIDENCE LEVEL OF INTERNS FOR PERFORMING ROOT CANAL TREATMENT : A DESCRIPTIVE CROSS-SECTIONAL STUDY

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### ABSTRACT

### INTRODUCTION

Due to various anatomic complexities within root canals, endodontic treatment sometimes become a difficult dental procedure to perform even for the specialist. Many dental students consider endodontics to be complicated and stressful. However, dental students must be competent enough to manage specific clinical procedures. This study was conducted to assess the confidence level of dental interns in performing endodontic treatment.

### MATERIAL AND METHODS

A descriptive cross-sectional study was conducted among dental interns of Nepal from December 2021 to January 2022. Ethical clearance was obtained from institutional review committee of UCMS (UCMS/IRC/105/20). Census method was used for selecting study participants. An online questionnaire was distributed that covered demographic details and the interns' confidence level regarding endodontic treatment. Participants were asked to indicate their self confidence level by Likert scoring system ranging between 1-5. The data were analyzed in Statistical Package for Social Sciences (SPSS) version 20 software.

### RESULTS

Majority of dental interns were confident in establishing successful communication with patients during diagnosis, root canal treatment and irrigation. Placement of rubber dam, root canal shaping and management of flare-ups were the procedures in which dental interns reported the lowest confidence ( $2.21 \pm 1.047$ ,  $2.65 \pm .974$ ,  $3.31 \pm .780$ ). Lowest confidence was reported in the treatment of maxillary followed by mandibular molars ( $2.72 \pm .821$  and  $3.14 \pm .959$ ). They also reported the lowest confidence in teeth with root resorptions, immature apices and re-treatment cases ( $2.39 \pm .842$ ,  $2.49 \pm .836$  and  $2.52 \pm .981$ ).

### CONCLUSION

Dental interns reported confidence in carrying out basic endodontic skills but lower confidence in challenging and complicated procedures. Further training should be emphasized in management of such situations.

### KEYWORDS

Confidence level, Dental interns, Endodontic treatment, Questionnaire

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## INTRODUCTION

The increase in awareness among people to preserve their natural teeth is increasing the demand of endodontic treatment and this will presumably increase in the future.<sup>1</sup> Endodontic treatment sometimes become very challenging due to anatomical complexities, limited working area, and difficulty in achieving clean area before final restorations.<sup>2</sup>

Moreover, the complications and subsequent re-treatment are time consuming, unpredictable, difficult and are materials-wasting.<sup>3</sup> Practitioners can lose the level of confidence while dealing with such challenges leading to procedural mishaps and subsequent treatment failure. In order to deal with such problems and perform a successful endodontic treatment, dental students, interns and dental practitioners should develop good clinical skills, competence and self-confidence. The level of competence can also be evaluated based on the confidence level in performing various endodontic procedures. The strength and weakness of the education system is also revealed with this kind of studies since student reviews are essential to monitor the quality of the education.<sup>4</sup> As endodontic treatment steps are complex, the fresh graduates like interns and house officers lack sufficient self-confidence to perform such treatment independently, as they do not have appropriate preparedness to take up such challenges.<sup>5</sup> However, dental interns and house officers should acquire adequate knowledge, skills, trainings and self-confidence to make a sound diagnosis for reasonable treatment plan regarding endodontic cases. Dental interns should have adequate skills to make a sound diagnosis for reasonable treatment plan regarding endodontic cases. Therefore, the aim of the present study was to assess the confidence level of fresh graduates like interns while performing endodontic treatment, so we can assess the shortcoming and guide them accordingly.

## MATERIAL AND METHODS

A descriptive cross-sectional study was conducted as an online survey among dental interns all over Nepal. The ethical approval was received from the Institutional Review Committee (IRC) of Universal College of Medical Sciences Bahirahawa, Nepal. Data collection was performed for two months from December 2021 to January 2022. Census method was used for selection of study participants. Interns from all the dental institutions of Nepal were provided with the online questionnaire. Sample size was calculated using the following formula,

$$n_1 = Z^2 \times p \times q / e^2$$

Where,  $n_1$  = actual sample size,  $Z=1.96$  at confidence level = 95%;  $p$  = prevalence reported by recent study (diagnosis of endodontic diseases-28%)<sup>3</sup> with Margin of error ( $e$ ) = 2%;

By placing these values in the above-mentioned formula, total sample size was calculated as 1936.17.

However, there were only 455 dental interns present in overall 12 dental colleges of Nepal. So, the sample size was adjusted according to formula for finite population provided below:

$$n = \frac{z^2 p(1-p)}{e^2} \div 1 + \frac{z^2 p(1-p)}{e^2 N}$$

Where,  $n$  = Final sample size,  
 $N$  = 455 (total number of dental interns from 12 dental colleges of Nepal)

Calculated sample size of present study was 184. An online questionnaire after reviewing the relevant literature<sup>4</sup> was prepared using Google forms and a link was created. Link to the questionnaire and a cover letter along with an informed consent form were distributed to the dental interns from each dental college of Nepal. Response rate was 42%. Total of 190 dental interns responded to the questionnaire. The reliability of the questionnaire was tested by Cronbach's alpha and the value was found to be 0.90 which depicted good internal consistency of the questionnaire.

The questionnaire consisted of two sections: the first section comprised of the socio-demographic aspects and the second section consisted of questions related to interns' confidence level in performing endodontic treatment. The interns were asked to score some endodontic procedures with different diagnosis, steps of endodontic treatment in different types of teeth and management of different endodontic situation according to their self confidence levels. The responses from the dental interns with complete entry only, were included in the study. Those interns who did not give consent to participate and those with incomplete duty rotation in the Department of Conservative Dentistry and Endodontics were excluded from the study. Each question consisted of five options which showed the level of confidence at each step. They marked their level of confidence using five-point Likert scale: 1= not at all confident, 2= not very confident, 3=neutral, 4=confident, 5=very confident. The data collected from Google forms responses were entered in Microsoft Excel Sheet and analyzed using descriptive statistics like mean, standard deviation, frequency and percentages in SPSS version 20 software.

## RESULTS

Out of 455 dental interns who were provided with the online questionnaire, 190 (42%) responded. However, complete response of all the questions were obtained from only 184 study participants and were considered for analysis. Confidence level of dental interns regarding various steps of endodontic treatment were assessed among 184 interns and is given in Table 1, 2 and 3. Gender wise distribution was also calculated (Figure 1). Among 184 dental interns, 117 (63.6%) were females and 67 (36.4%) were males. The mean age of the study participants was 25.58±0.67 years. The scorings regarding self confidence level of various aspects of endodontic treatment revealed that placement of rubber dam (2.21±1.047) was the area where students felt the lowest confidence followed by management of inter-appointment flare-ups (2.65±.974) and root canal shaping (3.31±.780, Table 1). While scoring different types of teeth, maxillary and mandibular molars were the type of teeth that posed the most difficulty in terms of endodontic management (2.72±.821 and 3.14± .959 respectively, Table 2). Root

resorption, teeth with immature apices and endodontic retreatment ranked as the situations in which interns reported the lowest confidence levels 2.39±.842, 2.49±.836 and 2.52±.981, respectively (Table 3).

**Table 1. Confidence level in performing various endodontic procedures (n=184)**

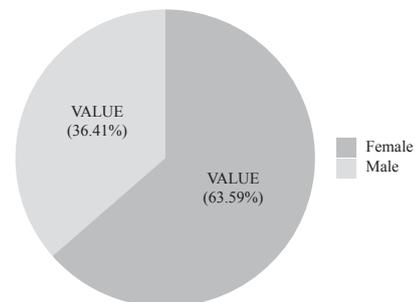
Endodontic Procedures	Not at all confident n%	Not very confident n%	Neutral n%	Confident n%	Very confident n%	Confidence level (Mean ± SD)
Diagnosis of endodontic treatment	-	16 (8.7)	46 (25)	112 (60)	10 (5.4)	3.63±.720
Achievement of anesthesia for endodontic treatment	2 (1.1)	23 (12.5)	54 (29.3)	81 (44)	24 (13)	3.55±.910
Placement of the rubber dam	58 (31.5)	55 (29.9)	46 (25)	24 (13)	1 (0.5)	2.21±1.047
Endodontic cavity preparation	3 (1.6)	19 (10.3)	61 (33.2)	83 (45.1)	18 (9.8)	3.51±.868
Measurement of the working length	-	18 (9.8)	52 (28.3)	96 (52.2)	18 (9.8)	3.62±.7944
Root canal shaping	2 (1.1)	27 (14.7)	70 (38)	82 (44.6)	3 (1.6)	3.31±.780
Root canal irrigation	-	11 (6)	43 (23.4)	107 (58.2)	23 (12.5)	3.77±.741
Root canal obturation	1 (0.5)	25 (13.6)	77 (41.8)	68 (37)	13 (7.1)	3.36±.825
Management of interappointment flare-ups	23 (12.5)	56 (30.4)	72 (39.1)	28 (15.2)	5 (2.7)	2.65±.974
Taking and interpreting radiographs	-	13 (7.1)	56 (30.4)	105 (57.1)	10 (5.4)	3.61±.701
Assessing quality of root canal obturation post-op	3 (1.6)	11 (6)	56 (30.4)	105 (57.1)	9 (4.9)	3.58±.750
Establishing successful communication with patient during treatment	-	3 (1.6)	42 (22.8)	109 (59.2)	30 (16.3)	3.90±.670
Restoration of endodontically treated teeth	7 (3.8)	10 (5.4)	40 (21.7)	106 (57.6)	21 (11.4)	3.67±.888

**Table 2. Confidence level about the endodontic treatment of different types of teeth**

Tooth Types	Not at all confident n%	Not very confident n%	Neutral n%	Confident n%	Very confident n%	Confidence level (Mean ± SD)
Maxillary anterior teeth	-	7 (3.8)	37 (20.1)	90 (48.9)	50 (27.2)	3.99±.793
Maxillary Premolars	5 (2.7)	13 (7.1)	61 (33.2)	84 (45.7)	21 (11.4)	3.56±.885
Maxillary Molars	15 (8.2)	50 (27.2)	91 (49.5)	28 (15.2)	-	2.72±.821
Mandibular anterior teeth	1 (0.5)	12 (6.5)	38 (20.7)	85 (46.2)	48 (26.1)	3.91±.868
Mandibular premolars	7 (3.8)	12 (6.5)	41 (22.3)	95 (51.6)	29 (15.8)	3.69±.945
Mandibular molars	7 (3.8)	43 (23.4)	60 (32.6)	65 (35.3)	9 (4.9)	3.14±.959

**Table 3. Confidence level during the management of different endodontic situations**

Different Endodontic situations	Not at all confident n%	Not very confident n%	Neutral n%	Confident n%	Very confident n%	Confidence level (Mean ± SD)
Vital pulp treatments	5 (2.7)	24 (13)	52 (28.3)	97 (52.7)	6 (3.3)	3.41±.857
Irreversible pulpitis	5 (2.7)	10 (5.4)	62 (33.7)	98 (53.3)	9 (4.9)	3.52±.789
Acute apical Periodontitis and abscess	8 (4.3)	23 (12.5)	82 (44.6)	65 (35.3)	6 (3.3)	3.21±.863
Chronic apical lesions	1 (0.5)	46 (25)	82 (44.6)	45 (24.5)	-	2.88±.850
Endoperio combined lesions	13 (7.1)	62 (33.7)	84 (45.7)	25 (13.6)	-	2.88±.850
Traumatic cases	15 (8.2)	60 (32.6)	79 (42.9)	30 (16.3)	-	2.67±.959
Root resorptions	25 (13.6)	80 (43.5)	61 (33.2)	18 (9.8)	-	2.39±.842
Teeth with immature apices	22 (12)	68 (37)	75 (40.8)	19 (10.3)	-	2.49±.836
Endodontic retreatment	33 (17.9)	55 (29.9)	64 (34.8)	32 (17.4)	-	2.52±.981



**Figure 1. Gender wise distribution of the respondents**

## DISCUSSION

The aim of this study was to evaluate the confidence levels among dental interns while performing endodontic treatment. Dental interns should be competent enough to perform endodontic procedures independently.<sup>5-7</sup> Due to complexity of the endodontic treatment, dental students lack self confidence in performing treatments independently which can influence the treatment outcome.

In the present study, majority of dental interns were confident in establishing successful communication with patients during treatment, diagnosis of endodontic diseases and root canal irrigation. However, they reported issues dealing with technical skill demanding procedures like placement of rubber dam, management of flare-ups and root canal shaping. This low level of confidence might be because these procedures are more technique sensitive.<sup>8,9</sup> Although rubber dam application is considered mandatory to perform any type of endodontic treatment, its application among interns and practitioners are limited. The low level of confidence can be a reason to this. Studies conducted by Awooda et al.<sup>10</sup> and Tanalp et al.<sup>6</sup> also explains low confidence level of students in placement of rubber dam due to unavailability of rubber dam during their training period, infrequent use by colleagues, seniors and other clinicians and its application methods that require proper skills and training. Literature also shows the reluctance among students and house officers in placement of rubber dam due to its cumbersome application, lack of appropriate clamps, patient acceptance and compliance.<sup>11,12</sup> In contrast, Mathew S et al.<sup>13</sup> showed that students were very confident in placement of rubber dam as they were trained in its application since their pre-clinical years. Hence, if these factors are considered and emphasized in training and practice, we can encourage and boost the confidence level of students and interns for the use of rubber dam during standard operating procedures in endodontics.

Similarly, flare ups present with severe pain and/or swelling following an endodontic treatment need an unscheduled visit and immediate treatment. This study showed lower level of confidence among interns regarding management of flare-ups. This might be due to lack of experience in dealing with such emergency situations and fear of mishaps. More importantly, students and interns tend to do procedural errors like over instrumentation, extrusion of irrigants and intracanal debris peri apically due to above mentioned reasons leading to flare ups. Davey J et al.<sup>14</sup>, explained low confidence level of students in management of flare-ups due to an unscheduled visit by a distressed patient and miss communication with them. The interns usually refer such cases to resident doctors or the specialist, as they don't have enough experience and confidence in dealing with such cases.<sup>15,16</sup> Mid-treatment flare ups are extremely undesirable for both patient and clinician and can determine doctor patient relationship. Therefore, Dental interns should be trained and taught the proper guidelines, measures and techniques to prevent and treat flare ups.

Root canal shaping facilitates subsequent cleaning and disinfection of complex root canal anatomy and is considered a critical step in endodontics.<sup>17</sup> Dental interns who participated in this study however, showed less confidence in root canal shaping. This can be due to the lack of skills,

experience and knowledge regarding the various anatomic complexities. Procedural errors like ledges, instrument separation, loss of working length, blockage of canals, zip and elbow formation are common during preparation of complex anatomies and curved canals.<sup>18</sup> Interns should be aware of all this and thoroughly trained to negotiate the root canal space in terms of techniques, materials, instruments as well as management of mishaps, if it occurs.

Participants of this study showed lowest confidence level while treating molars compared to other teeth. Molars have variable anatomies with complexities. Hence, is difficult to treat them endodontically, and it lowers the self-confidence of the students while treating it.<sup>19-22</sup> The location, morphological characteristics, lack of skills and experience also makes molar a difficult tooth to treat and re-treat. Moreover, mandibular molars are sometimes difficult to anesthetize. During evaluation of management of different endodontic situations, participants of this study showed more confidence with irreversible pulpitis, vital pulp treatments, acute apical periodontitis, and necrotic pulp with abscess and less confidence with challenging cases such as root resorption, immature apices and re treatments. Besides, the lack of experience and skills, the fear of failure, mishaps and complications also plays a role on the confidence level. Therefore, interns have to master the skills, techniques and confidence, overcoming all of the above-mentioned factors. In the present study, interns were found to have less confidence in the management of complex cases because of technique sensitivity and reduced exposure to such scenarios. Therefore, there should be problem-based approaches, specific training in management of complex clinical situations as well as incorporation of the competency-based approach to dental education to boost the competence as well as the confidence levels of the graduating dental interns.

## CONCLUSION

The dental interns were confident regarding easy steps of root canal treatment in which they were exposed to clinical experiences but were least confident regarding complicated steps like rubber dam application, root canal shaping and management of flare-up. Within the limitations of the study, the authors concluded that there is a need of increased clinical time, exposure, variety of cases and modification in imparting skill-based competence to the graduating interns to improved their levels of confidence and competence in the subject. Pre-clinical courses and greater clinical exposure to more complex procedures should be emphasized to refine their skills. The weak areas should be identified during endodontic treatment in order to bring resolutions for the delivery of skills during endodontic procedures.

This study assessed only the confidence levels but not the competence. As this was a self-administered questionnaire about self-perceived confidence levels, a certain amount of information bias might exist.

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## CONFLICT OF INTEREST

None

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