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Original research article

Prevalence of Dens invaginatus: Systematic review and meta-analysis

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Abstract

Objective: This systematic review and meta-analysis aims to determine the prevalence of dens invaginatus (DI) by evaluating studies of DI prevalence using cone beam computed tomography (CBCT) and two-dimensional radiography. It also compares the effects of CBCT and two-dimensional radiography in determining the prevalence of DI.

Materials and Method: Our study was conducted following PRISMA statements. The MeSH terms and keywords were used to search articles published in three electronic databases PubMed, Web of Science, and Scopus. In addition, the bibliographic references of the qualifying papers were manually searched. The search strategy was limited to English and Turkish articles published before 04 July 2024. Data was collected according to inclusion and exclusion criteria. The included studies were assessed by two independent reviewers using Joanna Briggs Institute's critical appraisal checklist for the prevalence studies.

Results: The analysis was carried out on 52,820 patients and 127,998 teeth in thirty-two studies. The prevalence of patients with DI and the prevalence of teeth with DI were 0.048 CI (0.020, 0.114) and 0.006 CI (0.005, 0.008), respectively. The event rate was 0.067 CI (0.034, 0.128) for the CBCT method and 0.018 CI (0.010, 0.032) for the two-dimensional radiography. The meta-regression shows that there is a statistical difference between CBCT and two-dimensional radiography methods (p =0.014).

Conclusion: Clinicians are likely to encounter DI many times. Therefore, an early identification and correct management of affected teeth is essential for improving the prognosis of these teeth. Additionally, there is a statistical difference between the determining methods of DI.

Registration: PROSPERO (CRD42023442411).

Keywords: Cone beam computed tomography; dens in dente; dental radiography; prevalence.

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[Abstract in Turkish is at the end of the manuscript]

Introduction

Dens Invaginatus (DI) was first described in 1794 as a type of dental anomaly in whale teeth.[1] It was first described in human teeth by a dentist named Socrates in 1856.[2] Since then, there have been many publications in the literature about the prevalence of this anomaly and the treatment variations. The etiology of DI is controversial and not fully known.[3] However, several theories have been accepted. In 1934, Kronfold[4] claimed that it was caused by the failure of the growth of the internal enamel epithelium. Fischer[5] in 1936 and Sprawson[6] in 1937 suggested that infection was the cause of this anomaly. In 1937, Rushton[7] argued that it formed as a result of the rapid and aggressive proliferation of the internal enamel epithelium and that this anomaly was even a benign neoplasm with limited growth. In 1950, Bruszt[8] suggested that it formed as a result of the fusion of two tooth germs. In 1957, Oehlers[9] suggested that it occurred as a result of the distortion of the enamel organ.

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The first classification was made by Hallet[10] in 1953. Although Vincent Townend[11] in 1974 and Schulze and Brand[12] in 1972 described a new classification, the classification introduced by Ohler's[9] in 1957 is the most used in the current literature. According to Oehler's[13] classification:

Type I Minor form: covered with enamel in the crown above the cementoenamel junction.

Type II Enamel-covered form: has advanced towards the root of the tooth but has a blind sac. It may or may not be in contact with the dental pulp.

Type III Enamel or cement-covered form: there is the aperture to the periodontal area with second foremen and has little or no pulp connection. The invagination may be completely lined by enamel, but frequently cementum will be found lining the invagination.

In addition to this classification, Oehler's[9,13] made additions to the classification according to its appearance on the crown. The first of them is a normal crown with a deep lingual or palatal pit. The other is conical, barrel-shaped, or peg-shaped with an incisal pit.

Numerous reports have been published on microscopic, ultrastructural, and microradiological examinations of teeth with DI malformation.[3,14] The enamel content of the DI is different from normal enamel mineral content.[14,15] It was observed that the enamel content of DI was hypo-mineralized and there was more phosphate and calcium, but it was poorer in terms of magnesium.[16] When the dentin under the DI is examined, some researchers have stated that this dentin structure is not affected,[14,17] while other researchers have claimed that this dentin is irregular and hypo-mineralized.[11,15]

This anomaly is clinically more common in maxillary lateral incisors and is often diagnosed incidentally or while investigating the cause of caries in the area. Microorganisms can easily enter through the aperture of the DI and multiply and spread to the pulpal and periapical tissues.[3] The proliferation of microorganisms may occur through small canals in thin dentin between DI and root canal pulp.[18] Because this process occurs very quickly, pulp and periapical tissues can become infected, often without symptoms. If patients with DI are caught before the development of caries, the pit on the palatal surface should be covered with restorative materials as a preventive treatment.[19]

Although there are many studies on the prevalence of DI, to the best of our knowledge, there is only one meta-analysis[20] in the current literature. However, this meta-analysis was based on studies which determined the prevalence of DI by using cone beam computed tomography (CBCT). In contrast, our systematic review and meta-analysis investigated studies which determined the prevalence of DI by using both CBCT and two-dimensional radiography. Additionally, we compared CBCT and two-dimensional radiography methods.

Materials and Method

The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) checklist was followed in reporting and writing this systematic review and meta-analysis.[21] The study protocol was registered in the PROSPERO with the CRD42023442411 ID number.

The research questions were determined as follows:

1- What is the prevalence of patients with DI?

2- What is the prevalence of teeth with DI?

3- What is the difference between CBCT and two-dimensional radiography methods?

The study was designed according to POS:

Population: Patients with permanent teeth

Outcome: The prevalence of DI teeth and the prevalence of patients with DI

Study pattern: Observational studies

Inclusion criteria: Studies in English and Turkish languages published early or in full print before 04 July 2024 were selected. We included studies from which we directly obtained data on the prevalence of DI or studies from which we were able to calculate the prevalence of DI indirectly from their data.

Exclusion criteria: Studies were excluded according to the following criteria:

1. No available data in the study
2. Inability to communicate with the authors
3. Inability to retrieve data despite contacting authors
4. The study had been withdrawn from the database

Databases and search strategies

Three databases (PubMed, Web of Science, and Scopus) were systematically searched by two independent authors (MU, SM) using keywords and the MeSH (Medical Subject Headings) terms on 04 July 2024. In addition, a manual search of references from previous studies and reviews was performed. All processes were carried out independently by two researchers (MU, SM) to control the potential risk of bias in the systematic review and meta-analysis. Table 1 shows the results of all search strategies.

Selecting the studies

The search results obtained from the databases were transferred to the Endnote software. Duplicate studies were removed using EndNote software. Then, the remaining studies were transferred to the Microsoft Excel program, and duplicate studies were manually removed. Then, the titles, abstracts, and full texts of these studies were screened respectively according to the inclusion criteria. The studies selected by both researchers were collected in a single file. Differences of opinion between the researchers were resolved through discussions, and the opinions of an experienced researcher (FÇ) were consulted for the studies where consensus could not be reached.

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Table 1. *Search strategy*

PubMed			
1	P	Permanent teeth OR permanent tooth Filters: English	28,329
2	O	Dens invaginatus Filters: English	846
3	SD	Prevalence Filters: English	3,439,857
4	Totally	1 AND 2 AND 3 Filters: English	26
Scopus			
1	P	Permanent teeth OR permanent tooth Filters: English	86,662
2	O	Dens invaginatus Filters: English	530
3	SD	Prevalence Filters: English	3,878,777
4	Totally	1 AND 2 AND 3 Filters: English	224
Web of Science			
1	P	Permanent teeth OR permanent tooth Filters: English	15,783
2	O	Dens invaginatus Filters: English	429
3	SD	Prevalence Filters: English	1,147,861
4	Totally	1 AND 2 AND 3 Filters: English	24

P: Population, O: Outcome, SD: Study Design.

Collecting data

Data such as authors, publication years, country, sample size, study type, the prevalence of affected teeth, the prevalence of affected patients, the radiographic method employed, and relationship with diseases from the obtained studies were collected. To avoid any potential bias, data collection was carried out by two independent researchers. Differences in opinions were resolved through discussions and the opinions of a third researcher were consulted when there was a disagreement.

Methodological quality assessment of the included studies in this systematic review and meta-analysis was conducted using the checklist for prevalence studies developed by the Joanna Briggs Institute (JBI).[22] This checklist has nine questions and is evaluated by answering “yes, no, not clear, and not applicable” for each question. If less than five of the questions are answered “yes”, the level of methodological quality is considered low; if 5 or 6 of the questions are answered “yes”, it is indicated as moderate, and if 7 to 9 of the items are answered “yes”, it is indicated as high quality. None of the individual studies were excluded based on methodological quality. These procedures were carried out independently by two researchers. In cases of disagreement, the final decision was made by discussing and consulting with a more experienced researcher.

Synthesis of the Data

Comprehensive Meta-Analysis 3 (CMA) was used to perform this systematic review and meta-analysis. The logit event and event rates with a 95% confidence interval (CI) were used as the effect size indexes. Heterogeneity between studies was analyzed using the Cochran Q and Higgins I^2 tests. If $I^2 \leq 50\%$, the fixed effects model was used; otherwise, the random effects model was used.[23] All tests were calculated as two-tailed. Besides, Meta-regression was performed to compare the results of the studies with CBCT and two-dimensional radiography methods. The moderator variable is the factor that can have an impact on the main results. In this study, the CBCT and the two-dimensional radiography methods were accepted as moderator variables affecting the prevalence of DI. Publication bias was assessed by using Egger’s test.[24]

Results

This systematic review and meta-analysis searched three databases (Pubmed, Scopus, Web of Science). All researchers conducted a simultaneous search on 04 July 2024 using Mesh terms and keywords in these databases. Two hundred and seventy-two studies were screened, and all of these studies were in English. Search results were transferred to EndNote software. Fifteen studies were excluded through the Endnote software due to duplication. A duplicate study is the same study from different databases. Then, the remaining studies were transferred to Microsoft Excel and twelve duplicate studies were removed manually. At the end, two hundred forty-five studies remained. The titles and abstracts of these remaining studies were screened according to exclusion criteria. One hundred and thirteen were excluded on the grounds of their titles and ninety-five on the grounds of their abstracts. Thirty-seven studies remained for full-text investigation. After analyzing the full texts, seven studies were excluded because two of them were case reports,[25,26] two were study reviews,[27,28] and for the other three full text was not available.[29-31] We sent two emails at fifteen-day intervals to authors of studies whose full text could not be accessed, but we did not receive any response. In addition, two study was found by manually searching the references of the obtained studies. As a result,

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thirty-two studies remained for analysis. These studies were thirty studies[23,32-60] related to the prevalence of patients with DI and eight studies[40,43,49,51,53,60-62] related to the prevalence of teeth with DI. Six studies were related to both. Figure 1 shows the Prisma Flow Diagram.

Meta-analysis was performed on two types of data. First, we analyzed data on the prevalence of patients with DI. A total of 30 studies[23,32-60] were included in this analysis. The results of this analysis were I^2=98.464%, tau= 1.260 and Q=1887,864. The random effects model was chosen because I^2 was ≥50. The logit event rate was -3.618 CI (-4.099, -3.137) and the event rate was 0.026 CI (0.016, 0.042). In our meta-analysis, publication bias was tested with the Egger Regression method. P= 0.0002 for studies based on the prevalence of patients with DI. For sensitivity analyses, twenty-one studies (Eight studies studies[36,37,41,42,47-49,57] answered yes once, four studies[23,33,35,60] answered yes twice, and nine studies[38-40,44,45,50,52,53,58] answered yes three times) were excluded to mitigate potential bias. Nine studies[32,34,43,46,51,54-56,59] remained for analysis. After adjustment, the results were obtained as I^2=98.975%, tau= 1.387 and Q=780,430. The random effects model was chosen because I^2 was ≥50. The logit event rate was -2.977 CI (-3.906, -2.047) and the event rate was 0.048 CI (0.020, 0.114). Egger's testing showed no significant publication bias (p=0.083) (Figure 2).

Second, we analyzed data on the prevalence of teeth. A total of eight studies[40,43,49,51,53,60-62] were included in this analysis. The results of this analysis were found I^2=91.873%, Tau= 0.387, and Q=86.137. The random effects model was chosen because I^2 was ≥50. The logit event rate was -5.070 CI (-5.368, -4.772) and the event rate was 0.006 CI (0.005, 0.008). A P-value of 0.99 from the Egger Regression test suggests that there is no evidence of publication bias in the studies based on the prevalence of teeth. (Figure 3).

Eight studies[40,42,43,51,53,58-60] were conducted with the CBCT method, and the other studies were conducted with the two-dimensional radiography method. The logit event rate was -2.636 CI (-3.357, -1.915) and the event rate was 0.067 CI (0.034, 0.128) for the CBCT method. The logit event rate was -4.027 CI (-4.635, -3.420) and the event rate was 0.018 CI (0.010, 0.032) for the two-dimensional radiography. The result of the meta-regression conducted with the moderator variable CBCT and two- dimensional radiography methods was statistically significant (Q =6.04, df = 1, p =0.014). These results showed that the CBCT method determined more prevalence of DI than the other method (Figure 4).

The checklist developed by JBI for prevalence studies was used to test the publication bias of individual studies. Our meta-analysis included thirty-one studies. Eight studies[36,37,41,42,47-49,57] answered yes once, 4 studies[23,33,35,60] answered yes twice, 11 studies[36,37,41,42,47-49,57,61,62] answered yes three times, and 7 studies[34,43,46,51,54,55,59] answered yes four times, and all of them were accepted as having low methodological quality. One study[56] answered yes five times and one study[32] answered yes six times, they were accepted as having moderate methodological quality (Table 2).

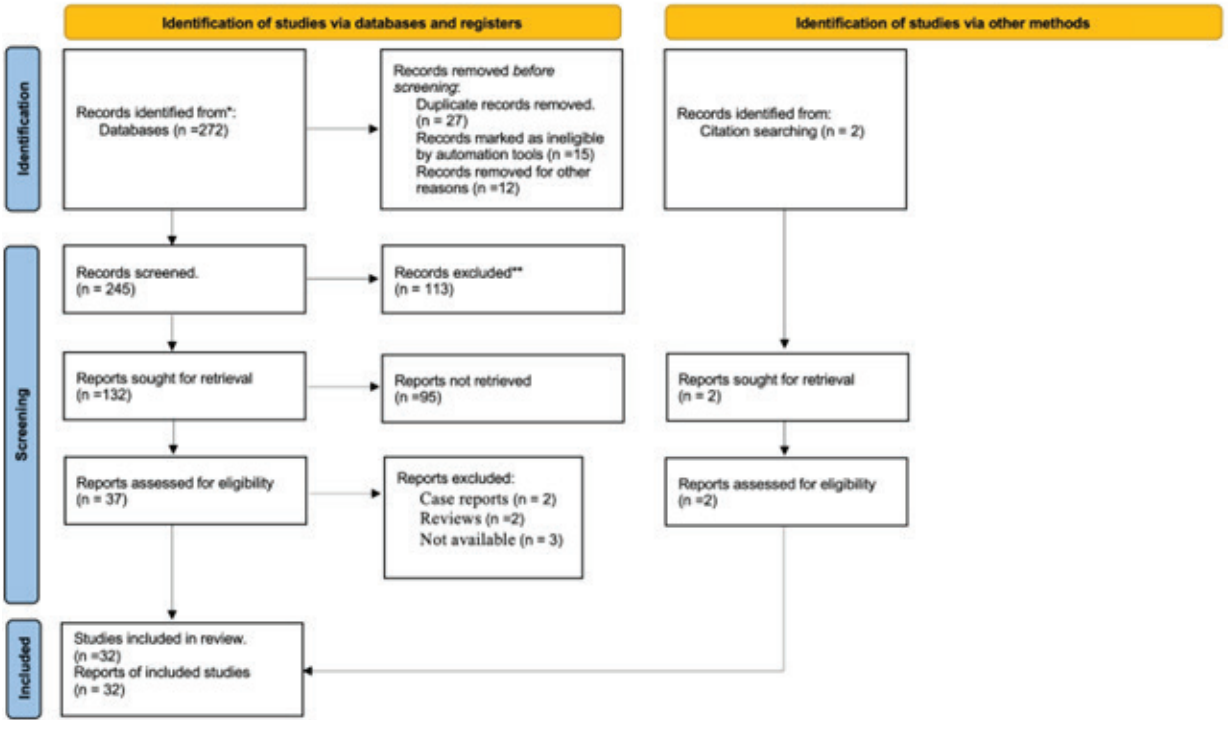


Figure 1. *PRISMA flow diagram of the search process*

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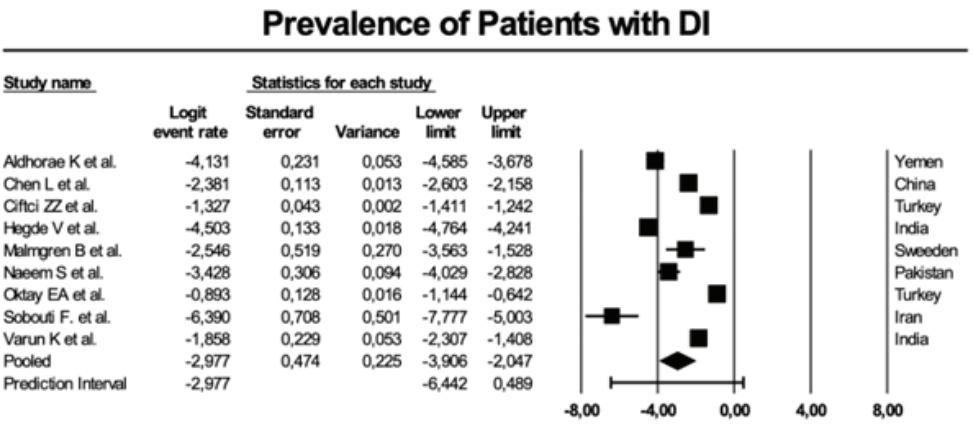


Figure 2. *The Forest plot of patient with DI*

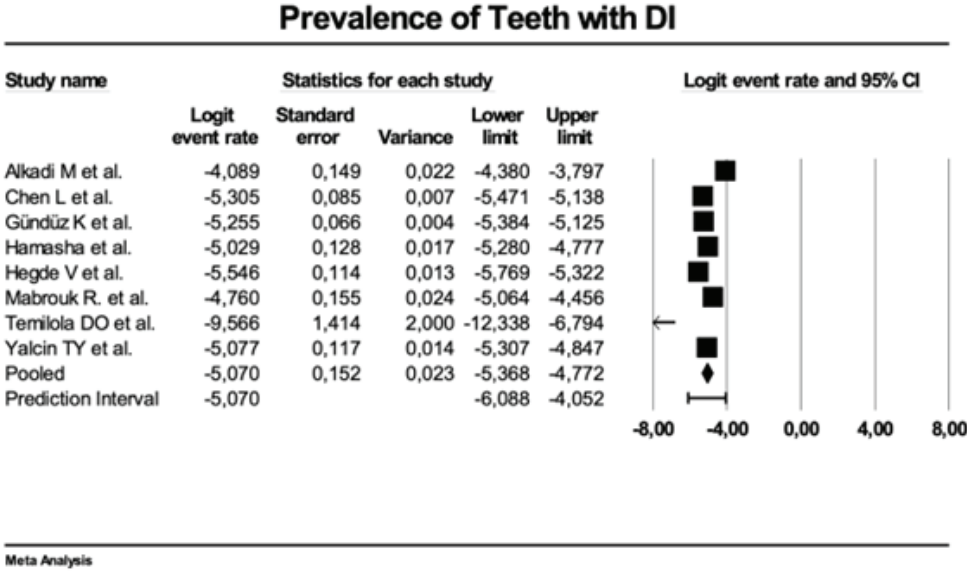


Figure 3. *The Forest plot of teeth with DI*

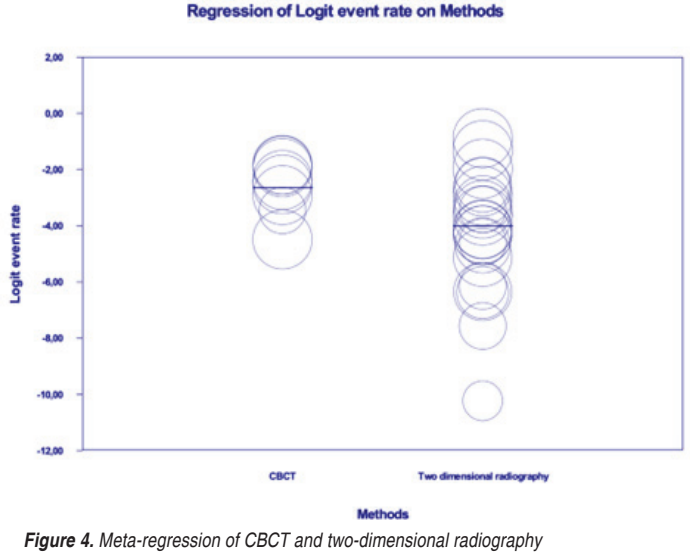


Figure 4. *Meta-regression of CBCT and two-dimensional radiography*

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Table 2. *Quality assessment results of the studies*

No	Was the sample frame appropriate to address the target population?	Were study participants sampled in an appropriate way?	Was the sample size adequate?	Were the study subjects and the setting described in detail?	Was the data analysis conducted with sufficient coverage of the identified sample?	Were valid methods used for the identification of the condition?	Was the condition measured in a standard, reliable way for all participants?	Was there appropriate statistical analysis?	Was the response rate adequate, and if not, was the low response rate managed appropriately?
Akcam MO et al. (33)	N	N	U	N	U	Y	Y	N	NA
Aldhorae K et al. (34)	Y	N	U	Y	U	Y	Y	N	NA
Alkadi M et al. (40)	N	N	Y	N	U	Y	Y	N	NA
Cakici F et al. (41)	N	N	U	N	U	Y	N	N	NA
Capar ID et al. (42)	N	N	U	N	U	Y	N	N	NA
Chen L et al. (43)	Y	N	U	Y	U	Y	Y	N	NA
Cho SY1 et al. (44)	Y	N	U	Y	U	Y	N	N	NA
Cho SY2 et al. (45)	Y	N	U	Y	U	Y	N	N	NA
Ciftci ZZ et al. (46)	Y	N	U	Y	U	Y	Y	N	NA
Citak M et al. (35)	N	N	U	N	U	Y	Y	N	NA
Colak H et al. (47)	N	N	U	N	U	Y	N	N	NA
Fekonja A et al. (48)	N	N	U	N	U	Y	N	N	NA
Gündüz K et al. (49)	N	N	U	N	U	Y	N	N	NA
Hamasha et al. (61)	Y	N	U	Y	U	Y	N	N	NA
Harini N et al. (50)	Y	N	U	Y	U	Y	N	N	NA
Hegde V et al. (51)	Y	N	U	Y	U	Y	Y	N	NA
Kashmoola MA et al. (23)	N	N	U	N	U	Y	N	Y	NA
Kirzioglu et al. (52)	Y	N	U	Y	U	Y	N	N	NA
Mabrouk R et al. (53)	Y	N	U	Y	U	Y	N	N	NA
Malmgren B et al. (54)	Y	N	U	Y	U	Y	Y	N	NA
Mir A et al. (36)	N	N	U	N	U	Y	N	N	NA
Naeem S et al. (55)	Y	Y	U	Y	U	Y	N	N	NA
Oktay EA et al. (56)	Y	Y	Y	Y	U	Y	N	N	NA
Prabhu V et al. (57)	N	N	U	N	U	Y	N	N	NA
Rozylo TK et al. (58)	Y	N	U	Y	U	Y	N	N	NA
Sener S et al. (37)	N	N	U	N	U	Y	N	N	NA
Simsek H et al. (38)	N	N	Y	N	U	Y	Y	N	NA
Sobouti F. et al. (32)	Y	Y	Y	Y	U	Y	Y	N	NA
Temilola DO et al. (62)	Y	N	U	Y	U	Y	N	Y	NA
Uslu O et al. (39)	N	N	Y	N	U	Y	Y	N	NA
Varun K et al. (59)	Y	N	U	Y	U	Y	Y	N	NA
Yalcin TY et al. (60)	N	N	U	N	U	Y	Y	N	NA

Y: Yes, N: No, U: Unclear, NA: Not applicabl

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Table 3. *Characteristics and main findings studies*

Name	Country	Year	Sample Size	Total	Methods	Study type	Relationship with diseases
Akcam MO et al. (33)	Turkey	2010	209P	14P	OPG	Retrospective Study	Unilateral cleft lip and palate
Aldhorae K et al. (34)	Yemen	2019	1202P	19P	OPG	Retrospective study	-
Alkadi M et al. (40)	Saudi Arabia	2021	505P 2790T	37P 46T	CBCT	Retrospective study	-
Cakici F et al. (41)	Turkey	2010	1012P	13P	Full-mouth periapical and panoramic radiographs	Retrospective study	-
Capar ID et al. (42)	Turkey	2015	300P	41P	CBCT, OPG	Retrospective study	-
Chen L et al. (43)	China	2021	1004P 28112T	85P 139T	CBCT	Retrospective study	-
Cho SY1 et al. (44)	China	2006	448P	4P	OPG	Retrospective study	Dens evaginatus
Cho SY2 et al. (45)	China	2008	32P	1P	OPG	Retrospective study	-
Ciftci ZZ et al. (46)	Turkey	2021	3228P	677P	OPG	Retrospective cross-sectional study	-
Citak M et al. (35)	Turkey	2016	1964P	1P	OPG	Retrospective study	Maxillary lateral incisor agenesis
Colak H et al. (47)	Turkey	2012	6912P	12P	OPG	Retrospective study	-
Fekonja A et al.(48)	Slovenia	2017	473P	1P	Clinical and radiographic examinations	Retrospective study	-
Gündüz K et al. (49)	Turkey	2013	4556P 44067T	116P 229T	OPG Periapical radiography	Retrospective study	-
Hamasha et al. (61)	Jordan	2004	9377T	61T	OPG	Retrospective study	-
Harini N et al. (50)	India	2019	14022P	0P	Clinical examination and panoramic radiograph	A hospital-based study	-
Hegde V et al. (51)	India	2022	5201P 19798T	57P 77T	CBCT	A study using cone-beam computed tomography	-
Kashmoola MA et al. (23)	Malaysia	2021	100P	1P	OPG	Cross-sectional study	-
Kirzioglu et al. (52)	Turkey	2009	2477P	300P	OPG	Retrospective study	-
Mabrouk R. et al. (53)	Tunisia	2021	200P 4945T	25P 42T	CBCT	Retrospective descriptive study	-
Malmgren B et al. (54)	Sweden	2021	55P	4P	OPG	Retrospective study	Bisphosphonate Therapy
Mir A et al. (36)	India	2018	1000P	13P	OPG Periapical radiography	Radiographic study	-
Naeem S et al. (55)	Pakistan	2020	350P	11P	OPG	Descriptive study	Developmental dental anomaly
Oktay EA et al. (56)	Turkey	2022	296P	86P	OPG	A cross-sectional retrospective single center study	-
Prabhu V et al. (57)	India	2012	2740P	16P	Periapical films	Retrospective study	-
Rozylo TK et al. (58)	Poland	2018	33P	1P	CBCT	A radiological study	-
Sener S et al. (37)	Turkey	2011	1100P	17P	OPG	Retrospective study	-
Simsek H et al. (38)	Turkey	2019	186P	7P	OPG	Retrospective study	Obesity
Sobouti F. et al. (32)	Iran	2023	1194 P	2P	OPG	Retrospective study	
Temilola DO et al. (62)	Nigeria	2014	7135T	0T	Intraoral examination	Cross-sectional study	-
Uslu o et al. (39)	Turkey	2009	900P	45P	OPG	Retrospective study	-
Varun K et al. (59)	India	2022	163P	22P	CBCT	Retrospective study	-
Yalcin TY et al. (60)	Turkey	2022	958P 11774T	49P 73T	CBCT	Retrospective study	-

P: Patient, T: Teeth, OPG: Orthopantomography, CBCT: Cone Beam Computed Tomography

There were thirteen studies from Türkiye, five studies from India, three studies from China, and one study from each of the other countries (Yemen, Saudi Arabia, Slovenia, Jordan, Pakistan, Poland, Nigeria, Malaysia, Tunisia, Iran and Sweden). The analysis was carried out on 52,820 patients and 127,998 teeth. Eight studies were conducted with the CBCT method, and the other studies were conducted with the two-dimensional radiography method. The authors preferred a retrospective study design and examined the relationship between DI and unilateral cleft lip and palate, Dens Invaginatus, maxillary lateral incisor agenesis, bisphosphonate therapy, developmental dental anomaly, and obesity (Table 3).

Discussion

In this meta-analysis, three databases were searched. Two independent authors carried out all procedures and conducted the search using keywords and MeSH terms on 04 July 2024. Additionally, they searched manually the references of the obtained studies. Consequently, a total of 272 studies were screened. The first limitation of this meta-analysis is databases and language limitations. Meta-analysis must cover all databases without language restrictions. However, our meta-analysis included three databases with Turkish and English language limitations. Another limitation of this study is the sample selection in included studies. The included studies presented data on dental patient populations. However, studies must cover the entire population to accurately determine the prevalence of DI. Studies included in the meta-analysis must be of equal homogeneity for each race and country. Some races and countries have several studies, while others have none. There were studies from 14 countries and 3 continents in our study.

Only two studies[32,56] had moderate methodological quality, while the other 30 studies showed low methodological quality. For future studies, the checklist of observational studies in the current literature must be used to conduct studies that offer higher methodological quality.

Thirty studies evaluated patients with DI regardless of localization and the number of teeth affected by DI. Eight studies evaluated localization, and the number of teeth affected by DI. Six studies examined both. Future studies must be carried out on both parameters.

The included studies differed in the methods used to detect DI. Some authors preferred two-dimensional radiographs, while others used three-dimensional radiographs. Sera *et al.*[20] 2022 reported that they found 0.9% prevalence of DI in their analysis. This analysis was conducted on four studies using the CBCT method. Besides, this analysis did not include two-dimensional radiography using studies. We found that the mean effect size is 0.067 CI (0.034, 0.128) for the CBCT method and 0.018 CI (0.010, 0.032) for the two-dimensional radiography. The reason for the difference between the results of these studies is that our analysis included more studies than the other. Additionally, our study compared two-dimensional and CBCT methods. We found that there is a statistical difference between these methods (p =0.014). According to our results, the prevalence of DI in CBCT studies is more than the other method. Two-dimensional radiographs are limited to assessment in the coronal plane, potentially missing critical information in orthogonal planes. CBCT offers high scanning precision, making it a valuable tool for examining the structural characteristics of teeth in three dimensions. This advanced imaging technique may significantly enhance the accuracy of diagnosing Dens Invaginatus. There is no study comparing CBCT and two-dimensional methods in the current literature.

Publication bias was detected for analysis based on the prevalence of DI in patients. The source of publication bias may arise from the methodological quality of the included studies. Therefore, we excluded studies with poor methodological quality from the analysis. No publication bias was detected in our final analysis.

Thirteen studies were conducted on the prevalence of DI in Türkiye. Two studies used CBCT, and the others used two-dimensional radiography. The mean effect size was 0.039 CI (0.021, 0.071) of these studies. This event rate was higher than the world average 0.026 CI (0.016, 0.042).

Studies have been conducted to determine the relationship between this anomaly and other anomalies and diseases (cleft lip and palate, obesity, developmental dental anomaly) in the current literature. However, we do not have enough datasets to determine the precision of these data.

Conclusion

Within the limitations of this meta-analysis, the prevalence of patients with DI and the prevalence of teeth with DI are 0.028 (CI 0.017-0.045) and 0.011 (0.006-0.020), respectively. Therefore, an early identification and correct management of affected teeth is essential for improving the prognosis of these teeth. Additionally, there is a statistical difference between determining methods (CBCT and two-dimensional methods) of DI. Therefore, it may be recommended to prefer CBCT to determine DI in future studies.

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Dens invaginatus prevalansı: Sistematik inceleme ve meta-analiz

Özet

Amaç: Bu sistematik derleme ve meta-analiz, konik ışınlı bilgisayarlı tomografi (KIBT) ve iki boyutlu radyografi kullanılarak dens invaginatus (DI) yaygınlığını araştıran çalışmaları değerlendirerek DI prevalansını belirlemeyi amaçlamaktadır. Aynı zamanda KIBT ve iki boyutlu radyografinin DI prevalansını belirlemedeki etkilerini de karşılaştırmaktadır.

Gereç ve Yöntem: Çalışmamız PRISMA açıklamaları takip edilerek gerçekleştirildi. PubMed, Web of Science ve Scopus adlı üç elektronik veri tabanında yayınlanan makaleleri aramak için MeSH terimleri ve anahtar sözcükler kullanıldı. Ayrıca, nitelikli makalelerin bibliyografik referansları manuel olarak arandı. Arama stratejisi 04 Temmuz 2024 tarihinden önce yayınlanan İngilizce ve Türkçe makalelerle sınırlıydı. Veriler dahil etme ve hariç tutma kriterlerine göre toplandı. Dahil edilen çalışmalar, Joanna Briggs Enstitüsü'nün yaygınlık çalışmaları için eleştirel değerlendirme kontrol listesi kullanılarak iki bağımsız incelemeci tarafından değerlendirildi.

Bulgular: Bu meta-analize 32 çalışma dahil edildi. Analiz 52,820 hasta ve 127,998 diş üzerinde gerçekleştirildi. DI hastalarının prevalansı ve DI'lı dişlerin prevalansı sırasıyla 0.048 GA (0.020, 0.114) ve 0.006 GA (0.005, 0.008)'dir. Ortalama etki büyüklüğü KIBT yöntemi için 0.067 GA (0.034, 0.128), iki boyutlu radyografi için 0.018 GA (0.010, 0.032) 'dir. Meta-regresyon, KIBT ile iki boyutlu radyografi yöntemleri arasında istatistiksel bir fark olduğunu göstermektedir (p =0.014).

Sonuç: Klinisyenlerin DI ile birçok kez karşılaşması muhtemeldir. Bu nedenle, etkilenen dişlerin erken tanımlanması ve doğru tedavisi, bu dişlerin prognozunu iyileştirilmesi önemlidir. Ayrıca DI belirleme yöntemleri (KIBT ve iki boyutlu yöntemler) arasında istatistiksel olarak bir fark vardır.

Kayıt: PROSPERO (CRD42023442411).

Anahtar Kelimeler: Dens in dente; dental radyografi; konik ışınlı bilgisayarlı tomografi, prevalans

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