Original Research Paper

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# A Study on Regional Distribution of Interglobular Dentin in Crown and Root Portion of the Teeth.

**Abstract:**

**Introduction :** Interglobular dentin is the area of hypomineralized or unmineralized denitn. Interglobular dentin is located at various region in teeth.

**Aim :** To identify the most common location of interglobular dentin in ground section of teeth.

**Settings and Design** : the study comprised of 69 extracted tooth.

**Materials and Method:** The study comprised of 69 extracted teeth. Ground sections of all 69 extracted teeth were prepared with the help of Arkansas stone, mounted on glass slide with the help of DPX and then observed under routine microscope by 2 observers.

**Results:** The most common location of interglobular dentin is cervical third

**Conclusion:** The interglobular dentin is more commonly seen in cervical third portion of crown as well as root in males and females.

**Keywords :** Interglobular dentin, Ground section of teeth, Cervical area of teeth

## Introduction:

Interglobular dentin is defined as the area of hypomineralized or unmineralized dentin in which small globular areas failed to fuse or coalesce into a homogenous mass within a mature dentin. These zones are also called as interglobular spaces or globular dentin[1].

Broadly, interglobular dentin is more commonly seen in the area of crown but not in root of tooth. Microscopically interglobular dentin is more frequently seen in the circumpulpal dentine underneath the mantle dentin of crown. At the time of globular mineralization, the calcospherites or globular masses continuously fuse to form a large single calcified mass. Whenever these globular masses or calcospherites failed to fuse or not able to fuse thoroughly into homogenous masses, small areas which consists of poorly mineralized matrix are left which leads to formation of interglobular dentin[2,3].

A considerable amount of formation of interglobular dentin is recognized in various areas of crown as well as root portion of tooth which is formed under numerous pathological conditions like acquired rickets[4,5],fluorosis[6], hypophosphatemic rickets[7] and biliary atresia[8].

Various researches and studies on interglobular dentin has been done using light microscopy, ultrasonic microscopy and

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electron microscopy. As per these studies, interglobular dentin can be considered as unmineralized as well as hypomineralized dentin[9,10].

The interglobular dentin is seen in crown as well as root portion of teeth. So keeping this fact in mind, this study was designed to find in which portion of teeth the interglobular dentin is seen more commonly. Also, the interglobular dentin is present more commonly in which gender.

## Materials and Methods:

The duration of present study is from march 2019 to may 2019.

For the present study, a total of 69 extracted teeth were collected from Department of Oral Surgery and various other dental clinics. Out of 69 tooth, 36 teeth were extracted from male patients and 33 from female patients.A detailed history about why these teeth are extracted has been taken from the doctor. Various reasons for extractions are carious teeth, decayed teeth, orthodontic treatment reasons, periodontal problems etc.

For our study, we had included only those teeth which were extracted mainly for orthodontic treatment reasons and were caries free.

After collection of teeth, they were placed in hydrogen peroxide for 48 hours. After that they were placed in 10% formalin solution. For the preparation of ground section of teeth, arkansas stone was used. The teeth was reduced mesio-distally till the appropriate thickness of ground sections was achieved. After preparation, ground section of tooth was mounted on a glass slide with the help of DPX mounting media. The prepared ground sections were observed under light microscope.

For observing the presence or absence of interglobular dentin in the ground section, the teeth was divided into crown portion and root portion. The crown portion was further divided into three parts i.e. coronal ,middle and cervical parts. The root portion was also divided into three parts i.e. cervical, middle and apical.

All the data was recorded and master tables prepared (Table 1 and Table 2). After that,the data was analyzed. To avoid biased result regarding the presence or absence of interglobular dentin, two observers were assigned for recording the data.

Table 1. Presence of Interglobular Dentin in Crown

| GENDER | CROWN PORTION OF TOOTH | | |
|---|---|---|---|
| | CORONAL | MIDDLE | CERVICAL |
| MALE | 22 | 28 | 33 |
| FEMALE | 25 | 19 | 29 |

Table 2.presence of Interglobular Dentin in Root

| GENDER | ROOT PORTION OF TOOTH | | |
|---|---|---|---|
| | CERVICAL | MIDDLE | APICAL |
| MALE | 31 | 23 | 00 |
| FEMALE | 28 | 24 | 00 |

## Result:

In the present study, a total of 69 ground sections of teeth were used, Out of which 36 were from males and 33 were from female.Interglobular dentin in coronal,middle and cervical areas of crown and in middle and cervical areas of root were noted. (Figure 1, Figure 2, Figure 3, Figure 4,)

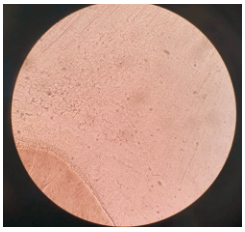


Fig 1: Interglobular dentin in coronal area of crown

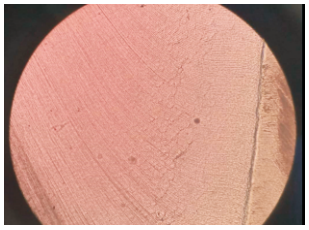


Fig 2 : Interglobular dentin in id crown area

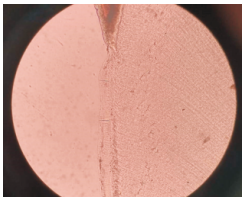


Fig 3 : Interglobular dentin in cervical area

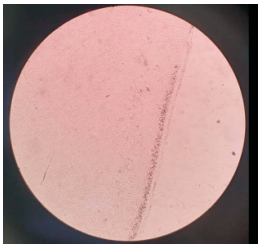
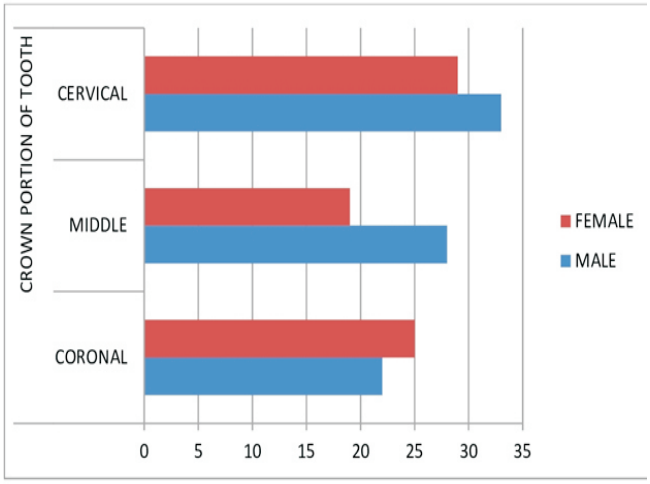


Fig 4 : Interglobular dentin in mid root area

In crown portion of teeth in males, the most common location of interglobular dentin was in cervical region which was followed by middle region and coronal region.

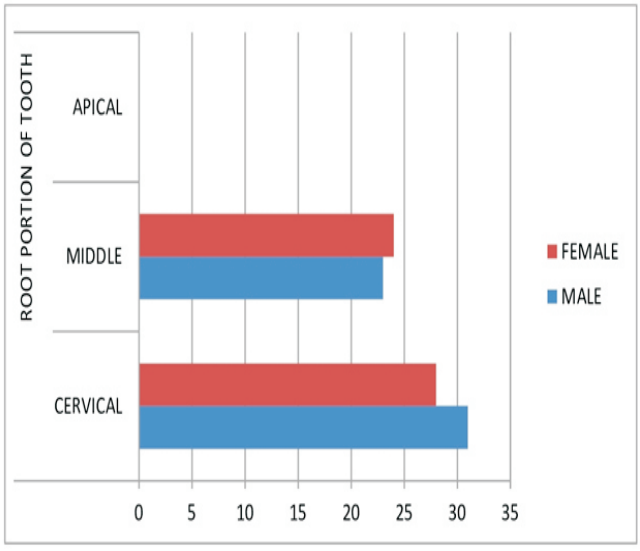
In crown portion of teeth in females, the most common location of interglobular dentin was found to be cervical region followed by coronal region and middle region.(Graph 1)




Graph 1 : crown portion of teeth

In the root portion of teeth in males, the most common location of interglobular dentin was cervical region which was followed by middle region and then apical region.

In the root portion of teeth in females, the most common location of interglobular dentin was cervical region followed by middle region and apical region.(Graph 2)




Graph 2 : root portion of teeth

## Discussion:

The interglobular dentin is considered as location of incomplete calcification.

It is believed that the dentinal fibers were pass through interglobular dentin, but this seen to be untrue. Although some dentinal tubules passes and some not, but these fine branches of dentinal tubules found to penetrate the interglobular dentin with contributing branches from adjoining dentinal fibers. one of the feasible causes may be that dentinal fibers branches may invade or infiltrate any uncalcified area to form groups, which prevents these area for undergoing complete calcification and these inadequate calcified site leads to formation of interglobular dentin[11,12,13].

It has been observed in various studies or researches that formation of interglobular dentin may be due to deficiency of vitamin D, chronic calcitonin deficiency, hypophosphatemia and intoxication by chemical substances[14,15].

The interglobular dentin formation in the crown portion of tooth is mainly correlated with maturation of enamel. We know that periodontal ligaments shows presence of epithelial cells during root formation which plays an crucial role in root dentine development. Also, few of the epithelial cells express the amelin which is a well known enamel matrix protein. Accordingly, it is imaginable that these epithelial cells regulate the process of dentinogenesis which results in the formation of interglobular dentin in the roots as seen in the crown. Nevertheless, the specific mechanism of formation of interglobular dentin is still unknown[16,17].

Interglobular dentin can be studied or identified in unstained ground sections of teeth. Also, interglobular dentin can be observed by staining ground section of teeth with Carbol-Fuchsin stain under transmitted light microscopy.The dye which is used in carbol –fuchsin staining is a fluorescence dye[18,19,20].

A limited number of research or study has been done regarding the location or distribution of interglobular dentin. One such study has been done by Jayawardena21 in the year 2009. In their study, they used 52 ground sections of tooth to identify the presence of interglobular in different regions of the crown and the root. They found that highest occurrence of

interglobular dentin was seen in cervical third and middle third which is followed by intercuspal and coronal third in the crown. Also, in roots, highest occurrence of interglobular dentin was found in cervical third followed by the middle third.

In our study we find the similar result. We have observed that in crown portion of teeth in both males and females, the most common location is the cervical region. But in males, cervical region is followed by middle region and coronal region while in females cervical region is followed by coronal region and middle region

Similarly in root portion of teeth in both males and females, the most common location seen is cervical region which is followed by middle region and apical region, which is the similar finding seen in study done by Jayawardena.

In another study done by Sato H, they observed that most of the teeth show presence of interglobular dentin in the cervical part of the roots. These findings were supportive of the results obtained in our study[22].

## Conclusion:

The current study showed that in crown portion as well as in root portion of teeth in both males and females.The most common location of interglobular dentin is the cervical region. Further studies can be done on larger samples and also on deciduous teeth.

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