Tooth and Pulp Anatomy

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Deciduous teeth

<table>
<thead>
<tr>
<th>Tooth Type</th>
<th>Age Tooth Comes In (months)</th>
<th>Age Tooth Is Lost (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Teeth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central Incisor</td>
<td>9.6</td>
<td>7.0</td>
</tr>
<tr>
<td>Lateral Incisor</td>
<td>12.4</td>
<td>8.0</td>
</tr>
<tr>
<td>Canine (Cuspid)</td>
<td>18.3</td>
<td>11.0</td>
</tr>
<tr>
<td>First Molar</td>
<td>15.7</td>
<td>10.0</td>
</tr>
<tr>
<td>Second Molar</td>
<td>26.2</td>
<td>10.5</td>
</tr>
<tr>
<td>Lower Teeth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second Molar</td>
<td>26.0</td>
<td>11.0</td>
</tr>
<tr>
<td>First Molar</td>
<td>15.1</td>
<td>10.0</td>
</tr>
<tr>
<td>Canine (Cuspid)</td>
<td>18.2</td>
<td>9.5</td>
</tr>
<tr>
<td>Lateral Incisor</td>
<td>11.5</td>
<td>7.0</td>
</tr>
<tr>
<td>Central Incisor</td>
<td>7.8</td>
<td>6.0</td>
</tr>
</tbody>
</table>
Permanent teeth

Age Tooth Comes In (years)

Central Incisor 7.35
Lateral Incisor 8.45
Canine (Cuspid) 11.35
First Premolar (Bicuspid) 10.20
Second Premolar (Bicuspid) 11.05
First Molar 6.30
Second Molar 12.25
Third Molar Variable 17 to 21
Third Molar
Second Molar 11.90
First Molar 6.05
Second Premolar (Bicuspid) 11.20
First Premolar (Bicuspid) 10.50
Canine (Cuspid) 10.35
Lateral Incisor 7.50
Central Incisor 6.40
Brown & Herbranson

Dental Anatomy & Interactive 3-D Tooth ATLAS

www.toothatlas.com
MORPHOLOGY of the PULP
ameloblasts
enamel
dentin
odontoblasts
Dentin Structure

• dentin is a calcified connective tissue penetrated by millions of tubules;
• their density varies from 40,000 to 70,000 tubules per square mm
• tubules are from 1 μm in diameter at the dentinoenamel junction to 3 μm at their pulpal surface and contain fluid that has a composition similar to extracellular fluid
FUNCTION of the PULP

The pulp lives for the dentin and the dentin lives by the grace of the pulp

- Nutrition of the dentin
- Innervation of the pulp and dentin
- Formation of the dentin
- Defense of the tooth and the pulp
PULP TISSUE

• connective tissue
• obviously rich in fluid
• highly vascularized
• cells
• collagen fibres
• vessels
• nerves
Supportive Elements

- Pulpal Blood Supply.
  - pulp blood vessels do not reach a large size.
  - At the apex and extending through the central pulp, one or more arterioles branch into smaller terminal arterioles or metarterioles that are
  - directed peripherally
  - Before the arterioles break up into capillary beds, arteriovenous anastomoses
  - often arise to connect the arteriole directly to a venule. These arteriole-venule shunts are identified by the presence of irregularly oriented myoepithelium-
PULP TISSUE

- principal support system for the peripheral pulp, which includes the large vessels and nerves from which branches extend to supply
- Plexuses of capillaries and small nerve fibers ramify in this subodontoblastic layer
- pulp showing major support systems, including arterioles with a muscular wall, thin-walled lymphatics, venules, and nerve bundles containing myelinated and unmyelinated nerve
The development of dentin

- Primer
- Secunder
- Tertier
The development of dentin

- Primer
- Secunder
- Tertier/irritation dentin
Percent Innervated Dentinal Tubules

A: > 40
B: 4.1 - 8.3
C: 0.2 - 1.0
D: 0.02 - 0.2
The pulp contains a pool of reserve cells, descendants of undifferentiated cells in the primitive dental papilla. These multipotential cells are likely a fibroblast type that retains the capability of dedifferentiating and then redifferentiating on demand into many of the mature cell types.
Fibroblasts

Most of the cells of the pulp are fibroblasts. Pulpal fibroblasts are spindle-shaped cells with ovoid nuclei. These cells exhibit wide variation in their degree of differentiation. Principal producers of collagen
Defense Cells

- histiocytes and Macrophages
- undifferentiated mesenchymal cells
- polymorphonuclear Leukocytes.
- lymphocytes and Plasma Cells
- mast cells
- odontoblasts
Odontoblasts

- In the pulp chamber: 50,000 cells/mm²
- In the root: significantly less
Caries media

localized irregular irritative dentin
Denticulus
Tooth notation

• Zsigmondy-Palmer, Chevron, Set-Square system

• The FDI two-digit system (international method)

• European, Scandinavian, Haderup system

• American (universal) system
FDI  Federation Dentaire Internationale

WHO  World Health Organization

IADR  International Association for Dental Research
Zsigmondy-Palmer, Chevron, Set-Square system

Right

\[
\begin{array}{cccccccc}
8 & 7 & 6 & 5 & 4 & 3 & 2 & 1 \\
\end{array}
\]

Left

\[
\begin{array}{cccccccc}
5 & 4 & 3 & 2 & 1 & 2 & 3 & 4 \\
\end{array}
\]
European, Scandinavian, Haderup system

8+ 7+ 6+ 5+ 4+ 3+ 2+ 1+1 +2 +3 +4 +5 +6 +7 +8

Right

8- 7- 6- 5- 4- 3- 2- 1-

Left

-1 -2 -3 -4 -5 -6 -7 -8