GINGIVAL CREVICULAR FLUID

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The gingival tissue is constantly subjected to mechanical and bacterial aggregations. Thus the defence mechanisms as mentioned below provide resistance to these actions.

Defence mechanisms-----

1. Saliva
2. Gingival crevicular fluid
3. Gingival epithelium

Gingival crevicular fluid:-

- Secreted from gingival sulcus
- Initially it was thought that the passage of fluid from the bloodstream through the tissues and exiting via the gingival sulcus.
- Later it was demonstrated that it is an inflammatory exudates.

Methods of collection:-

Difficulty in collection is due to scarcity of the material.

METHODS:-

1.Absorbing paper strips ::-

a. Brill technique [intrasulcular method] ::-

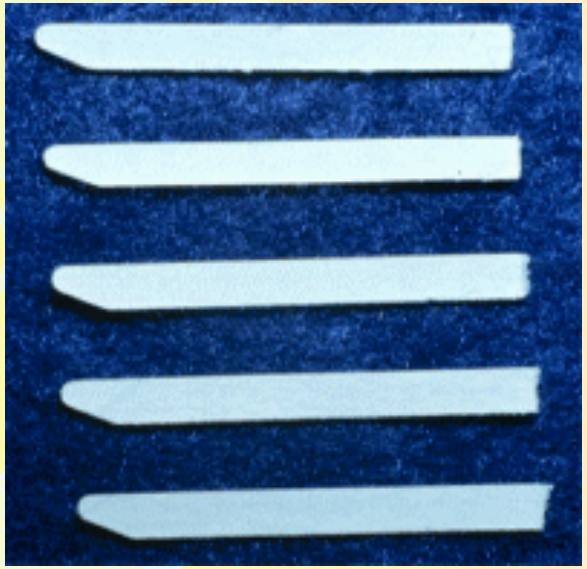
Places filter paper strip in pocket until resistance is encountered.

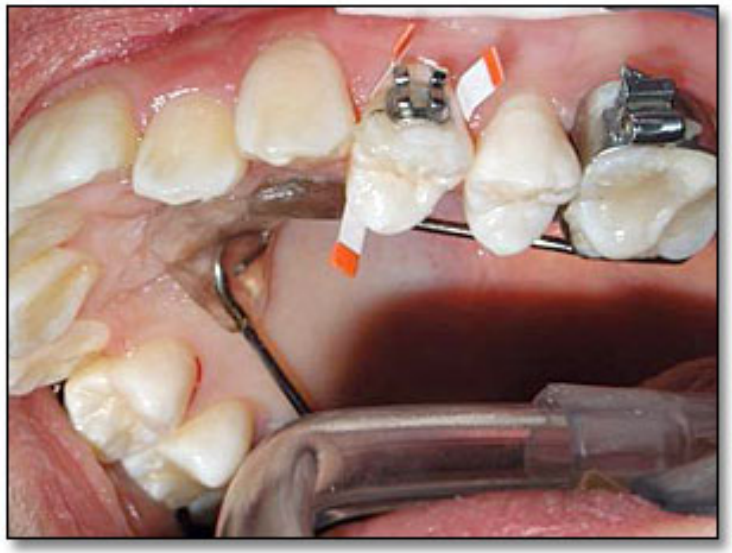
This induces --------> irritation of sulcular epithelium which itself triggers flow of fluid.

b. Loe and Holmpederson technique::-

To minimize irritation , strip is placed just at entrance of sulcus.

Thus fluid seeping out is picked up by paper, but sulcular epithelium is not in contact with paper.





Before measuring

GCF collection

Measurement shown as reading

2. Preweighed twisted threads::-

Threads placed in gingival crevice around tooth and amount of fluid collected was estimated by weighing the thread.

3 Micropipetes::-

By capillary action

Capillary tubes of standardized length and diameter are placed in pocket and their content is later centrifuged and analyzed.

4.Intracrevicular washings::-

Used to study GCF from clinically normal gingiva.

- One method uses a apliance consisting of hard acrylic plate covering maxilla with soft borders and a groove following the gingival margins, it is connected to four connection tubes. The washings are obtained by rinsing the crevicular areas from one side to another using a peristaltic pump.

- **A modification of method uses two injection needles fitted one within the other such that during sampling the inside, or ejection needle is at the bottom of the pocket and the outside or collecting needle is at the gingival margin.**

Permeability of junctional and sulcular epithelium:-

Albumin

Endotoxin

Thymidine

Histamine and

Phenytoin are known to penetrate sulcular epithelium.

- There is permeability to substances with molecular weight upto 1 million.
- Mechanism :- Intracellular movement of molecules and ions along intercellular spaces appears to be a possible mechanism.

Amount of GCF:-

1. By means of staining with ninhydrin
2. Electronic method with Periotron

The amount is very small. 1.5 mm wide strip inserted 1 mm in gingival sulcus absorbs 0.1 mg of GCF in 3 minutes in molar region.

Mean GCF volume :- 0.43 to 1.56 ml in molar region.

Composition:-

- **Cellular elements::-**
  - **Bacteria**
  - **Desquamated epithelial cells**
  - **Leukocytes[polymorphonuclear leukocytes , lymphocytes , monocytes , macrophages.]**
- **Electrolytes::-**
  - **Potassium**
  - **Sodium**
  - **calcium**

- Organic compounds::-
  - Carbohydrates
    - Glucose hexasomine
    - Hexuronic acid

      Glucose concentration in GCF is 3-4 times greater than that in serum
  - Proteins
    - Immunoglobulin IgG
    - Compliment

      Protein concentration in GCF < Protein concentration in serum

- **Metabolic and bacterial products**
  - **Lactic acid**
  - **Urea**
  - **Hydroxyproline**
  - **Endotoxins**
  - **Cytotoxic substances**
  - **Hydrogen sulphide**
  - **Antibacterial factors**
    - **Myeloperoxidase**
    - **lactoperoxidase**

- **Enzyme and enzyme inhibitors**
  - **Acid phosphatase**
  - **Alkaline phosphatase**
  - **α 1 antitrypsin**
  - **β 1 antitrypsin**
  - **Chondroitin sulphatase**
  - **Cytokines – IL 1α**

    -- IL 1β

    -- IL 6 & 8
  - **IgG, IgA, IgG_a, IgM**
  - **Endopeptidase**
  - **Hyaluronidase**

- **Lactate dehydrogenase**
- **Lactic acid**
- **Myeloperoxidase**
- **PGE2**
- **Collagenase**
- **Proteolytic enzymes –**
  mammalian proteiase
  bacterialproteinase

serum proteinase inhibitors

Methods for analysis of GCF components

1. Fluorometry for metalloproteases
2. ELISA forIL-1ß
3. Radio immuoassays
4. Direct and indirect immunodots.

Clinical significance :-

Amount of GCF is greater when inflammation is present and sometimes is proportional to severity of inflammation.

Circadian periodicity :-

Increase from 6 a.m. to 10 p.m.

Sex hormones :-

Female sex hormones increase GCF because of increase in vascular permeability.

Pregnancy

Ovulation and

Hormonal contraceptives ,,, all increase GCF.

Mechanical stimulation :-

Chewing and

Vigorous gingival brushing,,, both increase GCF.

Smoking :-

Cause increase in GCF secretion

Periodontal therapy :-

Cause increase in GCF during healing.

Drugs in GCF :-

Drugs excreted in GCF may be used advantageously in periodontal therapy.
Tetracycline and Metronidazole are drugs with concentration greater in GCF as compare to serum.


THANK
YOU