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Enhancement of
Orthodontic Anchorage
and Retention by
Local Injection of
Strontium

(An Experimental Study in Rats)

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- What is Strontium?
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Introduction

- Ortho = correct or perfect
- Dentic = tooth or teeth

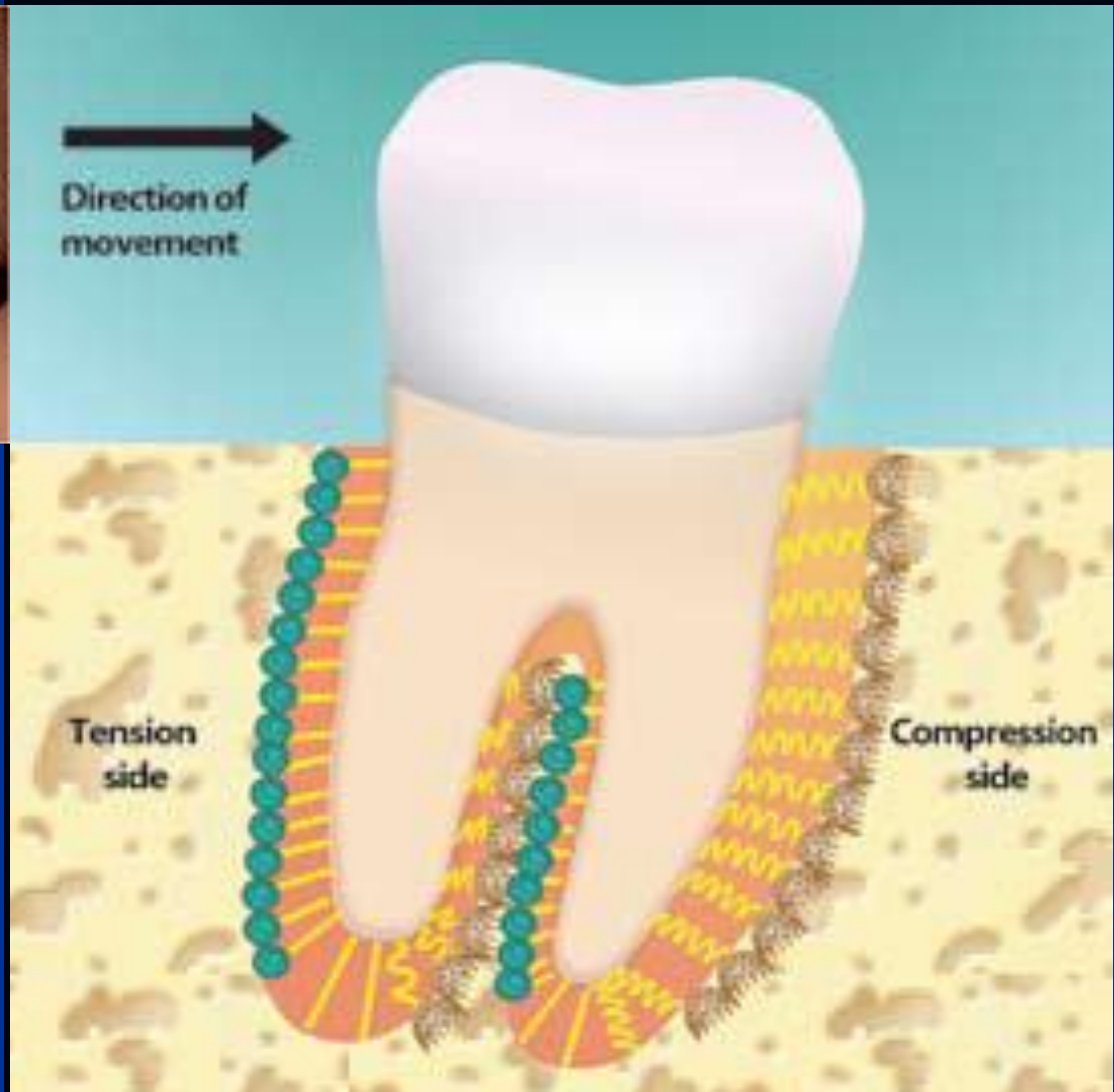


orthodontic

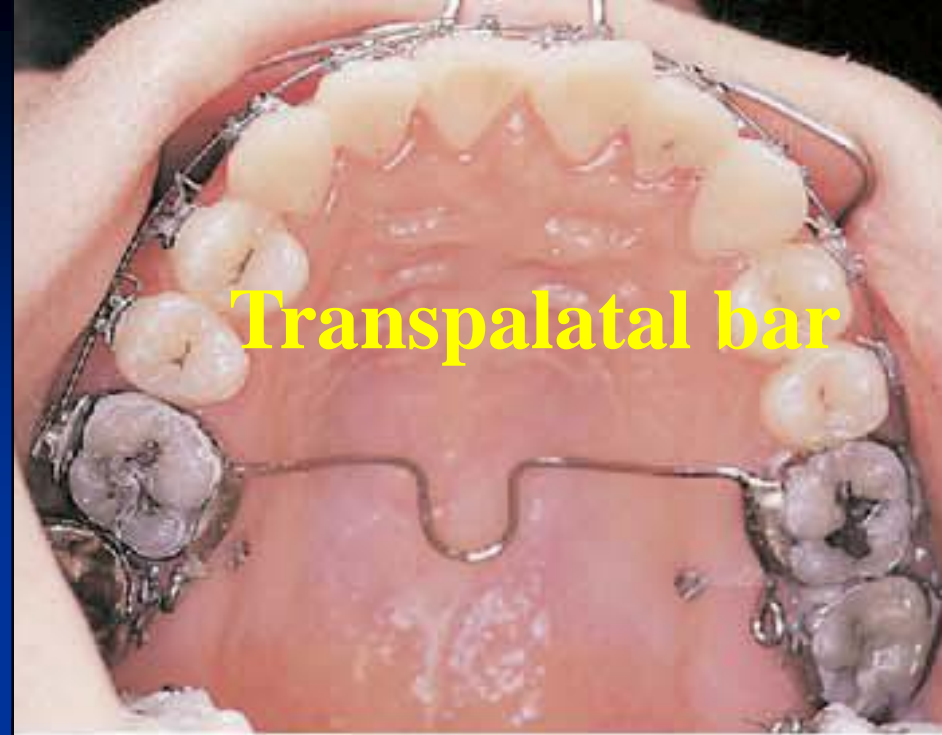


- anchorage = The resistance to undesired movement
- retention = prevent the teeth from return to origin,

Orthodontic Tooth Movement



Headgear



Removable acrylic retainer



Fixed retainers



Supracrestal Fibrotomy



All these anchorage and retentive measures have stood the test of time in providing the best possible treatment outcomes except for some cardinal limitations like difficulties in their:

- ❑ manufacture,
- ❑ applications and
- ❑ patient compliance.

It is the thank to pharmacology to

shed light on the use of
drugs as an **adjunct** for
orthodontic treatment
either by:



accelerating the speed of tooth movement
or by

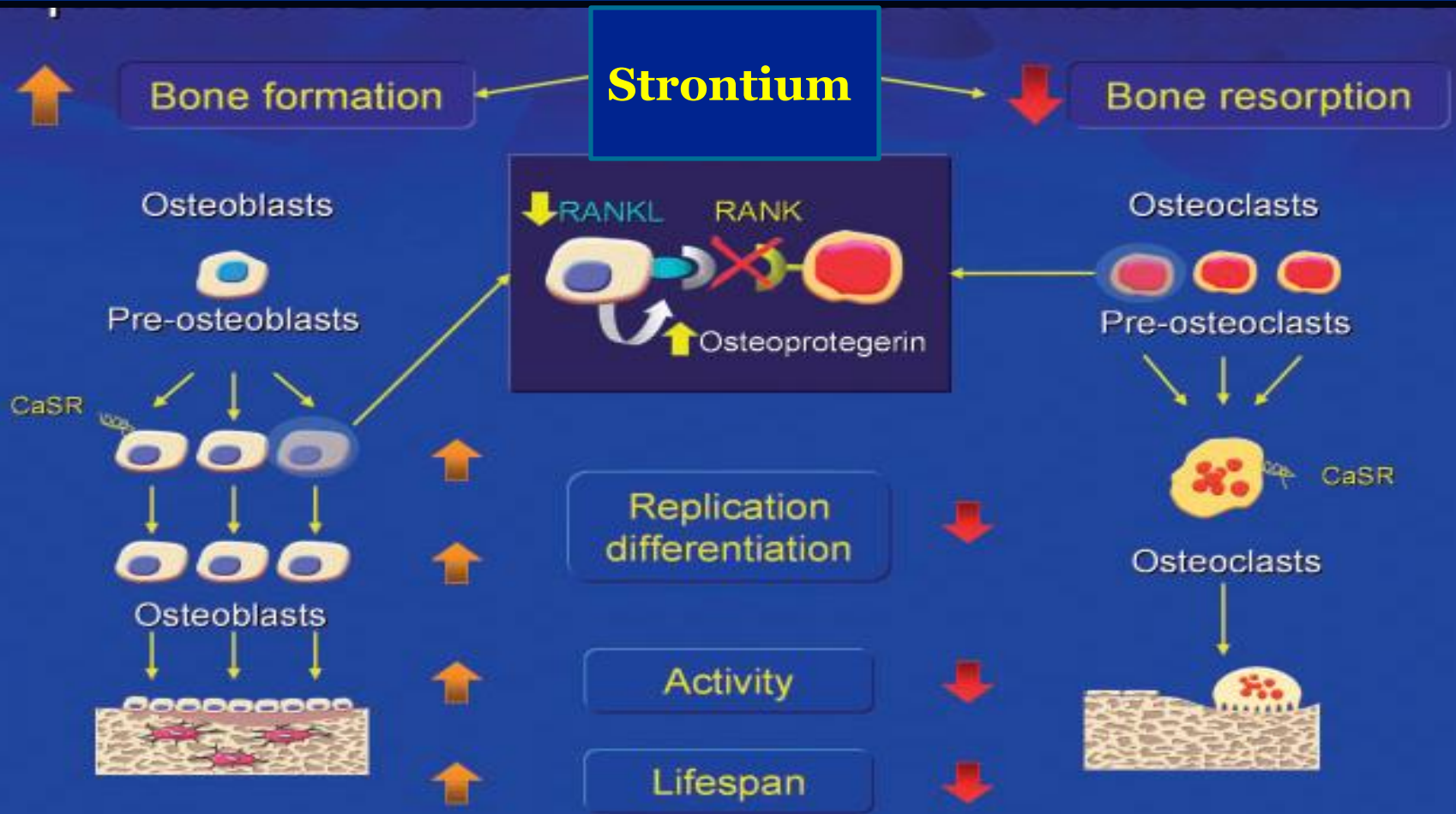
retarding the undesired movement of anchor
tooth and **preventing relapse** after orthodontic
treatment

Recent research advances suggest that **biological modulators** which **inhibit osteoclasts** could be used as new **adjunctive** approach to orthodontic treatment.

That's why.... the present experimental study, used for **first time** one of these modulators which is **strontium** and aimed to **investigate, clinical and histological effects** of the local injection of strontium on experimental and relapsed tooth movement in rats.

What is Strontium?

Strontium (Sr) is alkaline earth trace metal cation that has a high affinity for hydroxyapatite.



Therefore ... Strontium

is an active ingredient of **drugs** used
as a first line in treatment of
osteoporosis.

Methodology



The sample were **male wister rats**



Sample Categorization

6 Rats
1st group
T1= one
week

6 Rats
2nd group
T2= two
weeks

6 Rats
3rd group
T3= three
weeks

Exp.No.1

18 RATS

36 Rats



Exp.No.2

18 RATS

6 Rats
1st group
T1= one
week

6 Rats
2nd group
T2= two
weeks

6 Rats
3rd group
T3= three
weeks

Study design

```
graph TD; A([Study design]) --> B[Experiment No.1]; A --> C[Experiment No.2]
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Experiment No.1

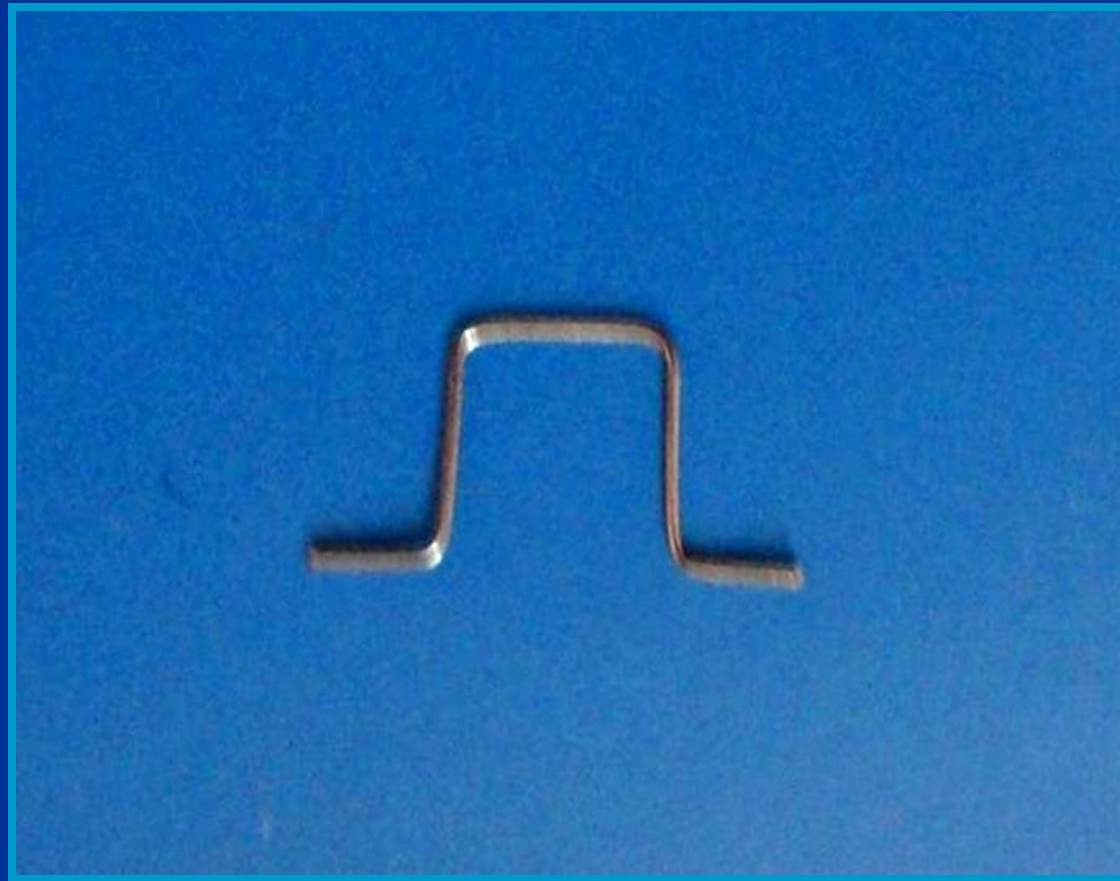
clinical and histological effects of local injection of the strontium on experimental tooth movement

Experiment No.2

clinical and histological effects of local injection of the strontium on relapsed tooth movement.

In both Experiments

Uniform standardized expansive springs which manufactured by the Iraqi Ministry of Science and Technology were used for moving the maxillary first molars buccaly.

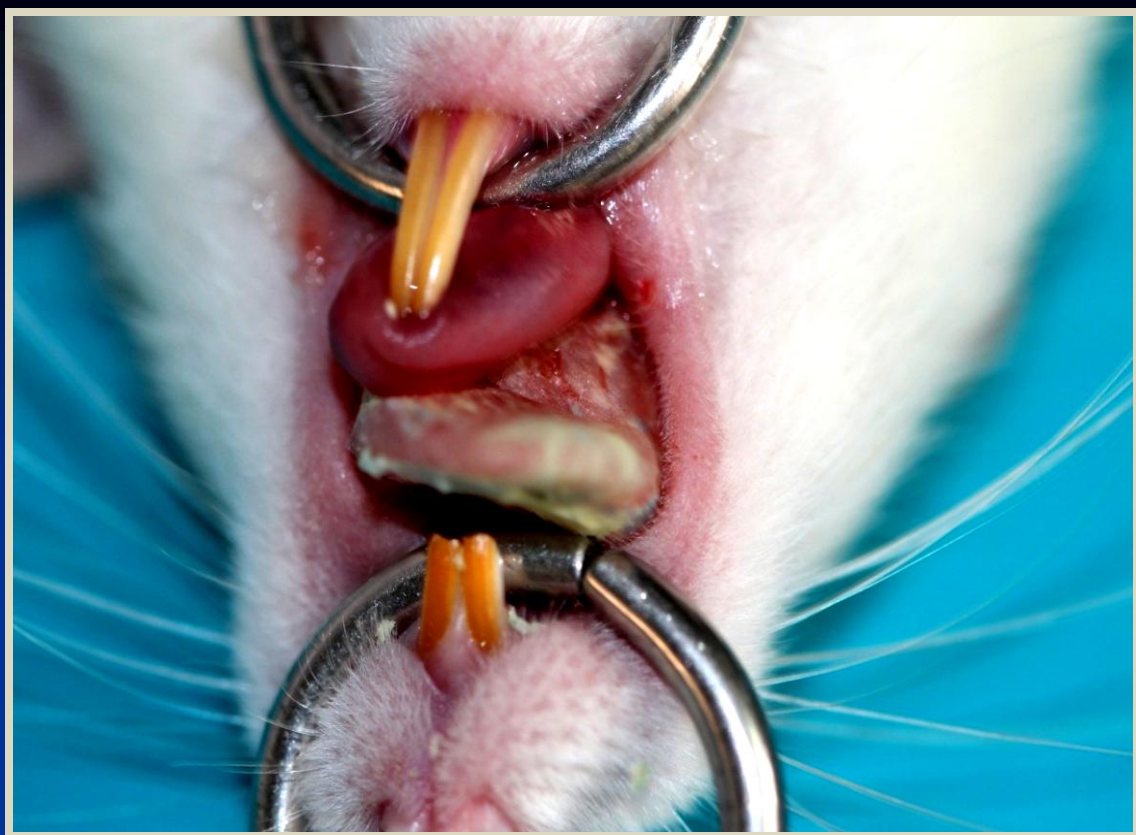


Experiment No.1





special tray



impression taking



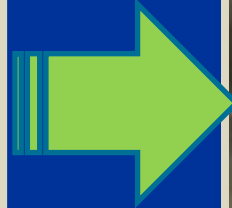
study model

Strontium

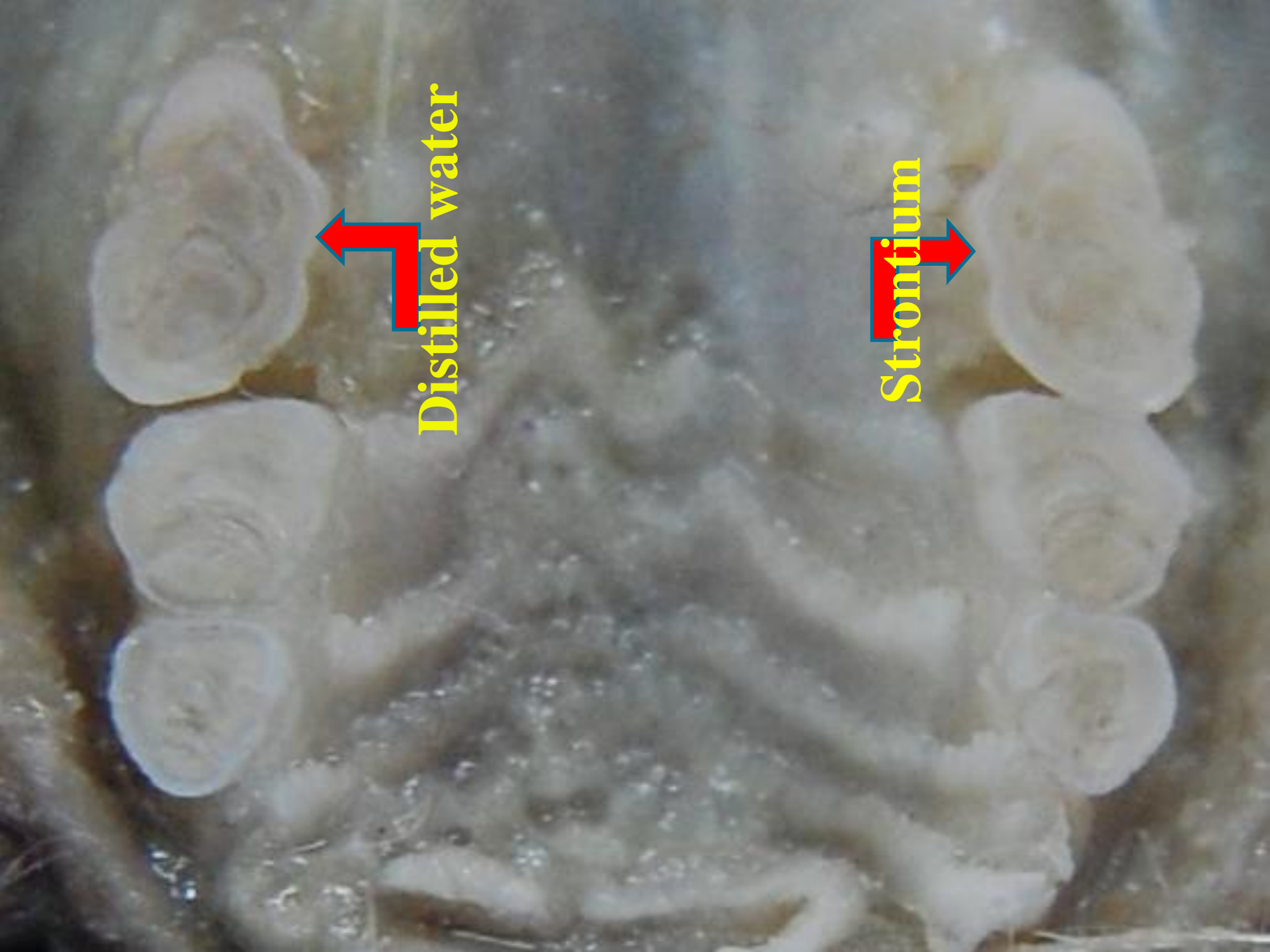
Distilled water



Experiment No.2



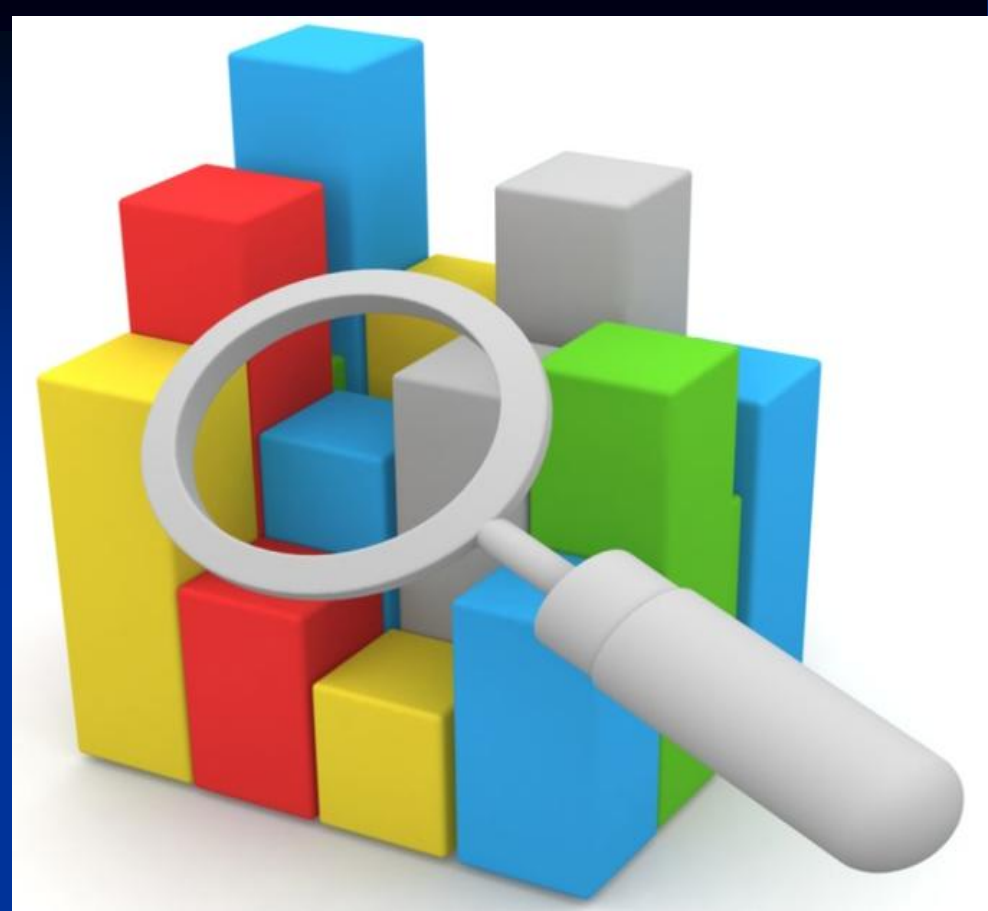
An expansive spring was applied to each animal's maxilla for three weeks to move the maxillary first molars buccally.



Distilled water

Strontium

Results



After the whole experimental period

□ Clinically

There were significant **inhibition** in both **experimental** and **relapsed** tooth movement of the left maxillary first molar

□ Histologically

There were significant **enhancement** in **osteoblast NO.** and significant **reduction** in **osteoclast NO.** at the injection site

Conclusion






The local injection of strontium is a **promising approach** for enhancing both orthodontic anchorage and retention.

Suggestions



- Evaluate the effect of local injection of strontium on the root resorption induced by orthodontic tooth movements.
- Further study is needed to evaluate the effect of systemic administration of strontium for enhancement of post orthodontic retention.
- Evaluate the ability of strontium in enhancing osseointegration of miniscrew implant.


-  Evaluate the ability of local application of strontium in ridge augmentation at the site of implant placement.
-  Investigate the effect of local application of strontium in socket healing after tooth extraction.
-  Evaluate the ability of local application of strontium in bone regeneration after severe periodontitis.

Bruce Lee said that

“If you always put limits
on everything you do,
It will spread into your
work and into your life.....”

There are no limits





**There are only plateaus,
and you must not stay
there, you must go
Beyond them.”**

الحمد لله



A bouquet of white daffodils with green stems and leaves against a black background. The flowers are in various stages of bloom, with some showing the characteristic six-petaled trumpet shape. The text 'Thank you Lord' is overlaid in a red, outlined font.

Thank

you

Lord

Any question

