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COMMON ERRORS DURING MANIPULATION ALGINATE

irreversible hydrocolloid impression material (IH)
Alginate
The following list of errors during manipulation I.H impression (Alginate) was concluded from published researches besides personal experience.

It is very useful for all dental team to be familiar with these notes of errors that might be occurred in the daily dental practice.
Alginate is still to be the material of choice for making a dental impression in R.Ds, Cr&Br……..

It is widely used, but may be associated with many errors or mistakes due to incorrect manipulation.
Announce and complains may be arise of many dentists or dental technicians due to their uses of alginate! ....

And some times seeing themselves in a real problem in front of their patients!!
Let us to agree with the fact, that the problem is not due to Alginate itself!!
Alginate has the following Advantages:

- It is low cost and easy to manipulate.

- Do not need for special equipment and can be used with stock tray.

- Can be easily separated from the loose and mobile teeth without extraction (Elastic).

- Setting time is less than other impression materials.
It has the following Shortcoming:

- The impression cannot be stored more than 10 min. (Synersis & Imbibition's phenomena).

- It is not compatible with stone gypsum material due to there is an interaction between them.  

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## Composition

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium Alginate</td>
<td>soluble</td>
<td>15%</td>
</tr>
<tr>
<td>Calcium sulphate</td>
<td>reactor</td>
<td>16%</td>
</tr>
<tr>
<td>Zinc oxide</td>
<td>filler particles</td>
<td>4%</td>
</tr>
<tr>
<td>Potassium titanium fluoride</td>
<td>accelerator</td>
<td>3%</td>
</tr>
<tr>
<td>Diatomaceous earth</td>
<td>give body</td>
<td>60%</td>
</tr>
<tr>
<td>Sodium phosphate</td>
<td>retarder</td>
<td>2%</td>
</tr>
</tbody>
</table>
The Role of Tri-sodium Phosphate seem to be work as a retarder

\[ 2 \text{Na}_3\text{PO}_4 + 3 \text{CaSO}_4 \rightarrow \text{Ca}_3(\text{PO}_4)_2 + 3 \text{Na}_2\text{SO}_4 \]

Tri-sod. phosph  Calc. Sulph.

\[ \text{K}_2\text{Alg} + n \text{CaSO}_4 \rightarrow n \text{K}_2\text{SO}_4 + \text{Ca}_n\text{Alg} \]

Potasu. Alg.  Calic. Sulph
List of 25 Errors
Error 1
Using an expired irreversible hydrocolloid:
This will lead to greatly reduced tear resistance and elasticity of the set material.

Solution
you have always to code the expiration date or test a little quantity of the material according to the manufacturer’s instructions.

Error 2
Incorrect storage of the material (Heat or Cool or Freeze), this will alter the setting time of the material and it will be:

severely in case of high cooling and irregular in case of heat.

Solution
Store irreversible hydrocolloid in a controlled temperature between (4.5 - 32.2) °C
Error 3
Unsealed container or unclosed after used;
This will lead to moisture contamination and alter of the chemical and physical properties of the Alginate material.
Solution
Test the material before using, otherwise you have to be sure of sealing.

Error 4
Using irreversible hydrocolloid that has been contaminated by particles of gypsum that this may contaminate the entire material.
Solution
Use a separated dry spatula and rubber bowel for mixing.
Error 5
Using too thin mixture of Alginate:

- this may cause voids in the impression.
- alginate flow out of the tray and cause gag reflex.
- the tray could not be able to provide enough pressure on the tissue. 5,6

Solution
follow the manufacturer's instructions concerning the proper water/powder ratio.
Error 6
Using too thick mixture of alginate:

- There will be inaccurate flow of the material.
- Set of the material before seating in the mouth and,
- If that will happen there will be wrong impression and wrong cast.

Solution
Follow the manufacturer’s instructions for mixing the material.
Error 7
Attempting to control the setting time of irreversible hydrocolloid by altering the w/p ratio:

This will lead to unreliable result \(^{5,6}\)

Solution
It is advisable to modify the temperature of the water to be more than the room temperature to set the mixture faster.
Using tap water to mix the powder:

- It is not too bad but,
- But it may contain different types of chemicals like chlorine, carbon fluoride, potassium, calcium and so on......, therefore it is not, easy to know how are these compounds affect the mixture,
- but sure it can alter the setting time.⁶

Solution
Scientifically mixing should be always by using distilled water, otherwise tap water should be used !.
Error 9.
Adding water to powder during mixing;
This will leave some remnant of powder unmixed and lead to inaccurate mixture.

Solution
Always powder should be added to water in order to be sure of dissolve of powder step by step.
Error 10.
Inadequate mixing time of the irreversible hydrocolloid;
If it is not mixed enough, *pockets of dry* or partially wetting can be caused and lead to distortion.

Solution
The correct Hand mixing should be 60 sec. and 15 sec. in case of vacuum mixing.
Error 11.
Partially mixed irreversible hydrocolloid and remaining of unmixed powder around the top of the mixing bowl;

The dry or partially wetted I.H is in contact with a tooth or soft tissue therefore, the dry material will expand after removal of the impression from the mouth and washing it.

Solution
Just be sure that there is no dry powder during preparing of the mixture.  5,6
Error 12.

Using an impression tray that is too small;
- this may lead to displace the soft tissues.
- the resulting casts may distort also.
- impression cannot be removed from the mouth without distortion and tearing, and
- some times the tray may be separated from the impression during pulling and removing.

Solution
Just be certain to use a suitable size of tray or modify the tray to be suitable.
Error 13
The impression tray is too large;

- The irreversible hydrocolloid material may be away from the soft tissues, e.g.; palatal surfaces.
- It also may be difficult to seat the tray posterior e.g.; ramus of mandible.

Solution
The selected tray should be a way from the tissue about few millimeters.
Error 14. Irreversible hydrocolloid sets under pressure;
This will cause a distorted impression.

Solution
Release the pressure required to seat the impression as soon as it is seated. ⁶
Error 15. 
applying continuous pressure when seating an impression in a perforated tray;

- It may lead to escape of impression material and lead to a thin layer cover the teeth.

Solution
Always impression should be remade.
Error 16.
Failure in support the tray during the initial setting time of the impression about 30 sec.;

It may cause movements of the impression due to tongue movements by the patient.

Solution
Always highly control the tray and the patient.
Error 17. 
Do not allow enough time for the impression material to flow before it sets; 
- that may lead imperfect registration of anatomy of the tissue.

Solution 
IH provides a 15 sec. for flow if you need more time you have to use cool water to increase it to 20 sec.
Error 18.
Making an impression with a coated layer of plaque and debris on the teeth and interproximal areas;
-This will produce inaccurate cast due to unreliable impression.

Solution
Routinely scaling and polishing should be done before making impression for such cases by using lubricating prophy paste.\textsuperscript{5,6}
Lubricating prophylactic paste is composed of:

- 50 g silicone compound
- 50 drops oil of peppermint
- 20 drops liquid petrolatum (mineral oil)
- 40 g flour of pumice

This composition is able to remove debris and plaque and leave a thin film of silicone to prevent adhering of IH with the teeth but it may not be preferable in Cr&Br impressions.
Error 19.
Failing to remove prophy pumice and paste may lead to the same problem of the plaque and debris.

Solution
Use strong air-water spray and scaling if necessary before impression.
**Error 20.**
Removing the impression before setting time;

- that may be lead to tearing of the impression (it is poor tearing resistance).

**Solution**
- Wait to exact setting time of the material.
- moreover give **additional 2min** for complete curing of the inner material.
- At the same time check the remains of the mixture in the bowel to be sure that the material is set.
**Error 21.**
Leaving the impression too long time in the patient mouth;

- It may lead to adherence of the material to the teeth and
- there will be no enough time to pour the impression with stone.

**Solution**
Always check time and follow the accurate method of manipulation.
Error 22.
Removing the impression slowly or with a rocking movements lead to distort the impression.

Solution
Twist the tray otherwise Break the seal by insert fingers posterior and slightly snap movements to the tray.
Error 23.
Failing to inspect the impression and pouring it without checking;
This may lead to undetected defect then to recall the patient for another visit to repeat the impression.

Solution
Check the impression by light and compare it with the patient mouth and the study model, if there is any defect it is better to remake the impression immediately better than the later visit.\textsuperscript{6,7}
Error 24
Failing to clean the impression before pouring with stone may interfere with producing an accurate cast.

Solution
Always rinse the impression with tap water to remove any debris.
Error 25.
Delay pouring the impression:

This will lead to syneresis and shrinkage of material.

Solution
Impression should be poured immediately after removed from the mouth otherwise should be covered by a wetted piece of cloth but not more than 10-12 min. in order to avoid dimensional changes.
Recommendations
Dental practitioners must be familiar with essential knowledge about impression materials.

Lack in familiar with the manipulation of this material is the main causing factor that will lead to the failure of the restoration.

Insisting to avoid scientific learning about this impression material may lead to deviations and accumulative of continuous errors.

So everyone in the field of dentistry should review the procedures and follow the regular basis in this subject.
References


5- Craig RG editors. Restorative dental materials. St. Louis (MO): CV Mosby; 5-In: 10th edi 1997. 404


Thank you