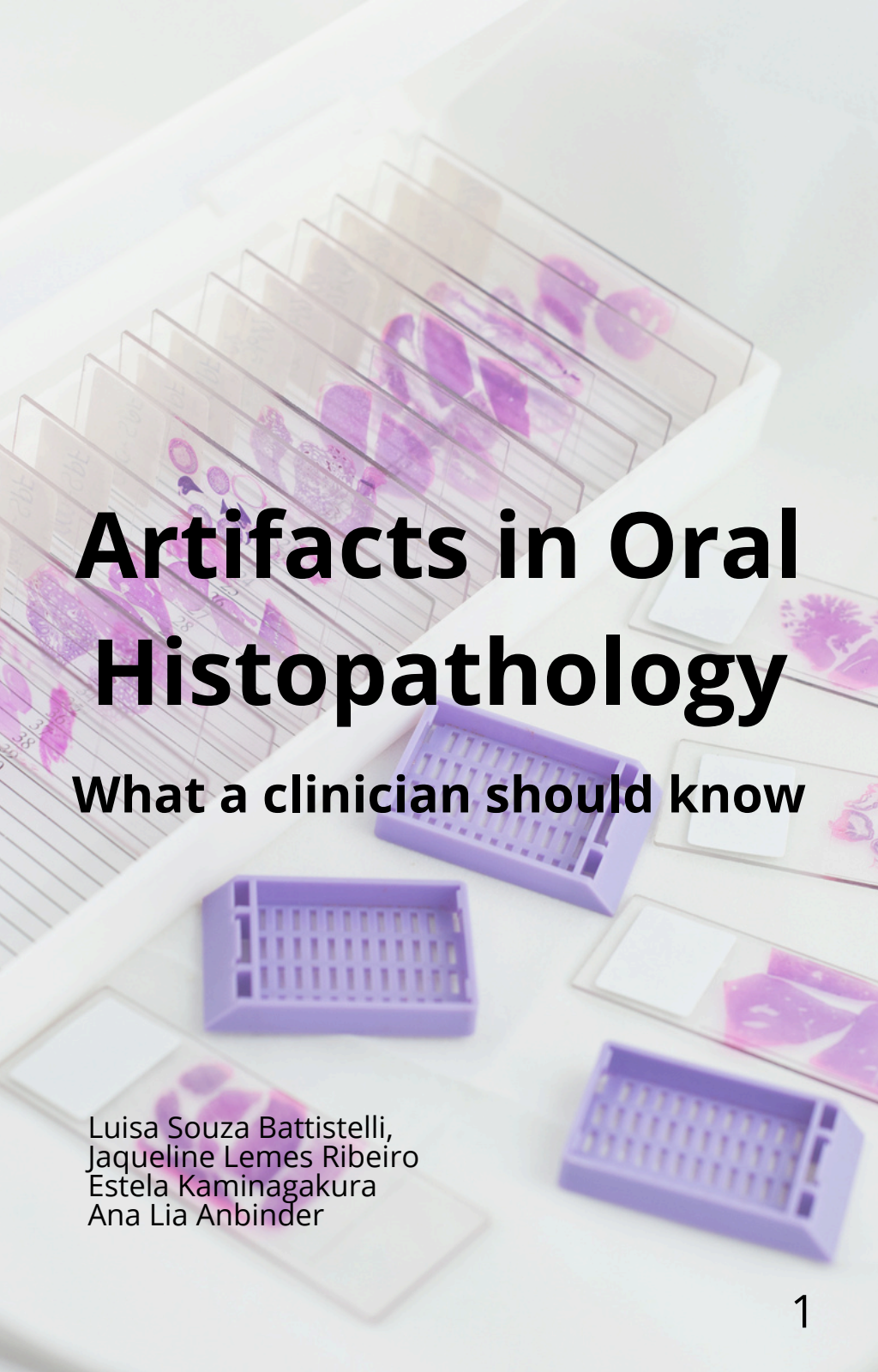

Artifacts in Oral Histopathology

What a clinician should know

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Do you know what technical artifacts are?

Artifacts are artificial structures or tissue alterations on a histological slide caused by external factors, resulting in an image that differs from the true state of the living tissue.

Artifacts are important because they can complicate or delay histological diagnosis. While some artifacts mimic features of specific diseases, others hinder the evaluation of margins or even prevent a definitive diagnosis.

The biopsy and all steps of histological processing can lead to artifact-related alterations. Therefore, the clinician can also contribute to the quality of the histological diagnosis by performing proper biopsy techniques.

Artifacts caused by the clinician

The biopsy technique and fixation are critical when it comes to artifacts. The most common artifacts that can be caused by clinicians include:

- Artifact due to anesthetic injection into the lesion.
- Coagulation due to Electrosurgical Knife or Laser use during surgery
- Crush or Squeeze artifact due to sample compression
- Vaccum artifact due to suction placed directly on the lesion
- Insuficient sample for diagnosis
- Improper fixation

During the biopsy: anesthetic injection into the lesion

If the anesthetic solution is injected directly into the lesion, the tissues may exhibit edema and hemorrhage that are not part of the preexisting pathology, making diagnosis more difficult.

How to avoid it?

Anesthetize around the lesion or use regional blocks.

During the biopsy: heat damage

The heat generated by the electric scalpel or laser coagulates the tissue at the lesion margins, preventing proper histological analysis of this area.

How to avoid it?

Use low milliamperage current or avoid using these types of instruments in excisional biopsies where surgical margin assessment is required. Since the margins of the specimen become damaged, larger specimens may help with histological diagnosis. Don’t forget to inform the pathologist if you use heat-generating cutting instruments.

During the biopsy: crush or squeeze artifact

Oral samples are highly susceptible to damage from crushing or squeezing by forceps or other surgical instruments.

How to avoid it?

Handle the specimen carefully, using instruments gently.
A suture can be placed in one edge of the specimen, in order to substitute the forceps for tissue
immobilization. This procedure also requires caution, since the suture thread itself can also damage the tissue to be analyzed.

During the biopsy: Surgical suctioning

When the suction device is placed directly on the tissue to be removed, the suction causes vacuolar structures in the tissue, which may be mistaken for vessels or fat.

How to avoid it?

Avoid placing the suction tip directly on the lesion.

During the biopsy: Insuficient sample for the diagnosis

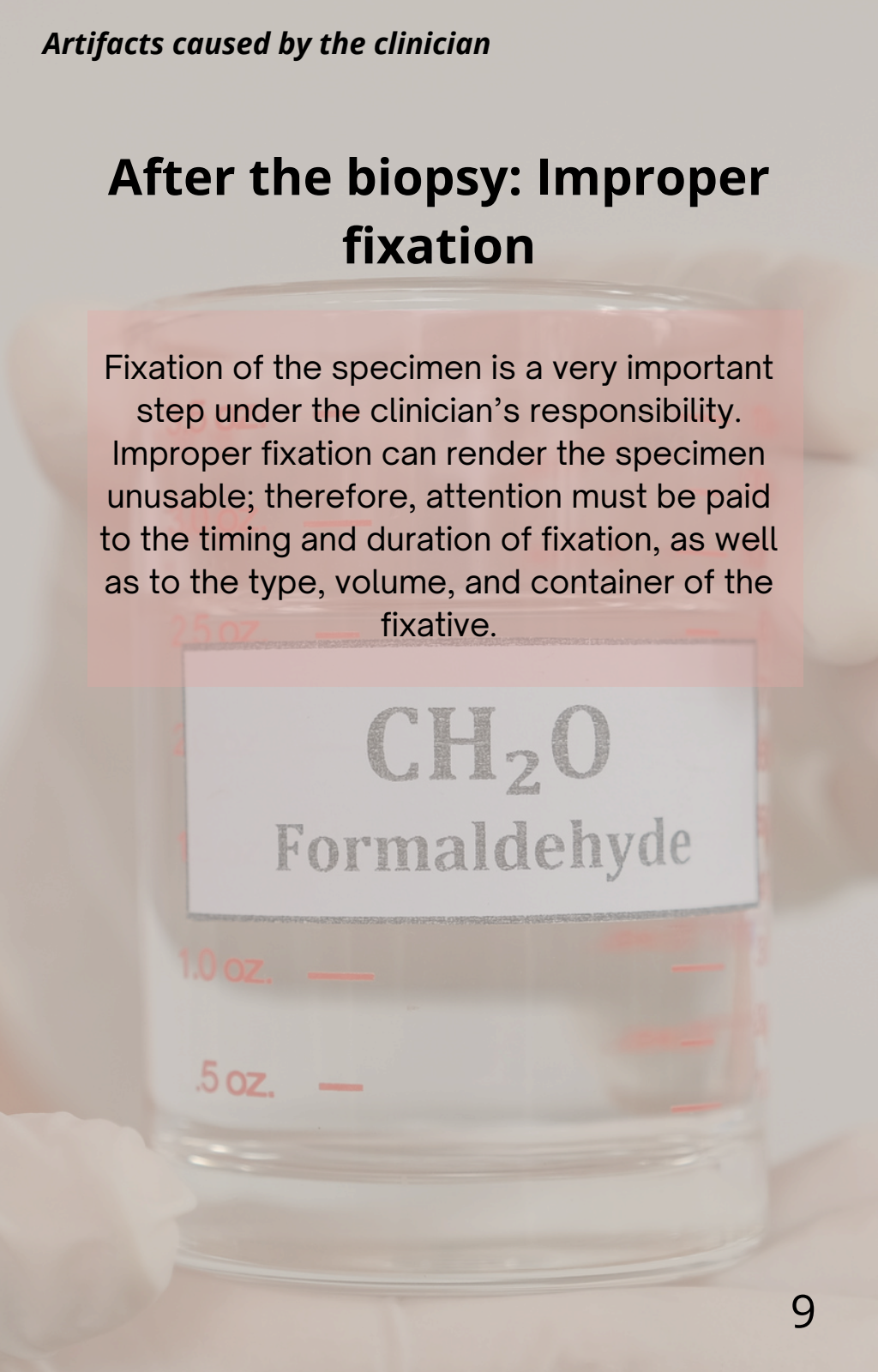
It happens when the excised specimen is too small and does not histopathologically represent the clinical lesion.

How to avoid it?

Take advantage of the fact that the patient is anesthetized and remove a representative sample of the lesion, including the full thickness of the mucosa.
Sometimes, being too conservative during a diagnostic biopsy ends up costing more time and money, as the procedure may need to be repeated.

After the biopsy: Improper fixation

Fixation of the specimen is a very important step under the clinician's responsibility. Improper fixation can render the specimen unusable; therefore, attention must be paid to the timing and duration of fixation, as well as to the type, volume, and container of the fixative.



After the biopsy: Improper fixation

Timing

If the specimen is not fixed immediately after removal, the cells undergo autolysis, which alters the tissue morphology and negatively affects the diagnosis.

How to avoid it?

Plan your surgery, have the appropriate fixative available in the office, and fix the specimen as quickly as possible.

After the biopsy: Improper fixation

The fixative solution

The most commonly recommended routine fixative is 10% neutral buffered formalin, in a volume 10 to 20 times greater than the specimen volume, for a minimum of 24h.
If the specimen is kept for too short a time or in an insufficient volume of fixative, autolysis is not completely halted.
Absolute formalin or alcohol hardens and shrinks the specimen, altering the tissue structure.

How to avoid it?

Always keep 10% formalin in your office, as well as wide-mouth containers that can hold 10 to 20 times the volume of the surgical specimen.
Laboratories usually provide fixative-filled containers for their clients. Plan ahead.

After the biopsy: Improper fixation

Thin specimens

Plaque-like lesions or biopsy material with little thickness tend to curl and lose their original shape during fixation, making it difficult to achieve proper embedding orientation.

How to avoid it?

Stretch the removed tissue over a sheet of sterile paper or cardboard, and place the entire set into the fixative solution.
The cardboard from suture packaging works very well for this purpose.

Help us spread this knowledge!

If you found this material useful, share it with colleagues, students, and other healthcare professionals.
Together, we can improve biopsy practices and reduce diagnostic errors caused by preventable artifacts