

# Treatment Guidelines for Gingivectomy and Crown Lengthening

The following guidelines pertain to the use of LIGHTMED's Er:YAG SAPPHIRE Dental Laser for performing gingivectomy and crown lengthening procedures.

All information presented herein has been compiled based on recommendations from experienced dental professionals, and is intended to serve as general guidance only. While the SAPPHIRE Dental Laser offers a highly effective and minimally invasive approach for soft and hard tissue management, LIGHTMED strongly advises all clinicians who are new to this technology to obtain formal professional training and to gain proficiency in the currently recommended laser-assisted treatment techniques prior to clinical implementation.

The LIGHTMED Er:YAG SAPPHIRE Dental Laser provides clinicians with a versatile and precise tool for performing gingivectomy and crown lengthening procedures. By combining soft and hard tissue capabilities, it allows for efficient, predictable, and minimally invasive treatments with enhanced patient comfort, avoiding the need for sutures. The SAPPHIRE Dental Laser also offers providers the required access in certain clinical situations where such access is challenging, and offers improved hemostatic control compared to traditional approaches.

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## Q: What is Gingivectomy and Crown Lengthening?

Gingivectomy and Crown Lengthening are periodontal surgical procedures designed to expose additional tooth structure for prosthodontic and/or aesthetic purposes. These treatments are indicated to facilitate the proper placement of direct or indirect restorations when the remaining ferrule is insufficient, or to correct gingival display and altered passive eruption. A gingivectomy involves the removal of soft tissue to reshape or reduce the gingival margin and attached gingiva, while crown lengthening includes osseous recontouring (osteotomy and osteoplasty) to increase the height of the clinical crown, and avoid violation of biologic width.

The SAPPHIRE Dental Laser is particularly advantageous for these procedures due to its ability to remove soft and hard tissues with minimal thermal damage, offer exceptional precision, and improve hemostatic control.

## Indications for Gingivectomy and Crown Lengthening

- 1. Insufficient Ferrule/Biologic Width Violation:** In cases due to a subgingival carious lesion, tooth fracture, or an existing restoration that needs to be redone, a gingivectomy or crown lengthening procedure may be performed to expose sound tooth structure, increasing the ferrule to deliver the restoration.
- 2. Excessive Gingival Display or Altered Passive Eruption:** A gingivectomy or crown lengthening may be performed to increase the length of the tooth and help create a more harmonious and aesthetic smile line.
- 3. Gingival Hyperplasia:** When there is an overgrowth of the gingival tissues due to inflammation or medically induced causes.
- 4. Enhanced Hemostatic Control:** The SAPPHIRE Dental Laser's precision and coagulative capabilities aid in achieving effective hemostasis and maintaining a clear surgical field.

# Treatment Guidelines for Gingivectomy and Crown Lengthening

Practitioners may use the SAPPHIRE Dental Laser for all gingivectomy and crown lengthening procedures; however, certain situations make it preferable over traditional techniques.

## Indications for Er:YAG Laser-Assisted Gingivectomy and Crown Lengthening

1. **Root Proximity:** In cases where the root proximity between the teeth, where fitting traditional instruments such as an end-cutting bur or bone file interproximally becomes challenging, the practitioner may use a narrow SAPPHIRE Dental Laser tip to gain access and perform the required ostectomy and osteoplasty.
2. **Minimal Bone Recontouring:** Where the need for ostectomy and osteoplasty is minimal, and a full-thickness flap is not necessary to achieve results.
3. **Patient Apprehensive to Surgery:** A laser-assisted procedure offers more comfort and generally does not require any sutures.

## Clinical Protocol for Er:YAG Laser-Assisted Gingivectomy and Crown Lengthening

### Step 1 – Assessment and Diagnosis

- **Comprehensive Evaluation:** Conduct a detailed clinical and radiographic examination to determine the extent of soft tissue and/or bone removal required.
- **Confirm Indication for Treatment:**
  - Insufficient Ferrule/Biologic Width Violation
  - Excessive Gingival Display or Altered Passive Eruption
  - Gingival Hyperplasia
  - Need to Achieve Hemostatic Control

### Step 2 – Preparation

- Before initiating the procedure, ensure full compliance with standard laser safety protocols. When operating in an open clinical space, inform all personnel within the vicinity of the treatment area that the laser is in use, and verify that all individuals, including the patient, assisting staff, and nearby operators, are wearing appropriate wavelength-specific protective eyewear (2,940nm).
- If the procedure is conducted within a closed or enclosed operatory, clearly label the entry door with a visible “Laser in Use” warning sign to prevent accidental entry and to ensure that all individuals entering the room are aware of the active laser environment.
- Administer local anesthesia.

### Step 3 – Laser Application Technique

- **Parameter Selection:** Adjust the SAPPHIRE Dental Laser to the recommended energy and frequency settings for soft tissue or bone removal as per the manufacturer’s guidelines. Maintain an air-water spray to cool the target tissue and prevent carbonization, and subsequent damage to the area.
- **Soft Tissue Resection (Gingivectomy and Gingivoplasty):** Hold the handpiece in a defocused position, using short, controlled sweeping strokes aiming at the soft tissue to remove the desired gingival tissue. Maintain consistent motion to avoid localized heat accumulation. Er:YAG’s short wavelength prevents deep tissue penetration; however, careful attention must still be paid to the laser to avoid local tissue damage.
- **Bone Recontouring (in the Case of Crown Lengthening):** Adjust the parameters and continue using short, controlled sweeping strokes to remove bone to expose sufficient sound tooth structure and preserve biologic width after the restoration is placed. Make sure that the laser’s tip is parallel to the long axis of the tooth at all times. Continuous irrigation is essential.

# Treatment Guidelines for Gingivectomy and Crown Lengthening

- **Site Evaluation:** Irrigate the site with sterile saline to remove debris. Confirm adequate bone reduction and exposure of tooth structure with a periodontal probe.
- **Coagulation:** Use the coagulation mode without air or water spray to achieve hemostasis and encourage clot formation. Suturing is typically unnecessary due to the laser's ability to produce a stable clot.

## Step 4 – Postoperative Care

- Prescribe anti-inflammatory or analgesic medication when indicated.
- Evaluate the need for antibiotics based on case complexity and the patient's medical history.
- Advise the patient on gentle oral hygiene, using a very soft toothbrush to clean the surgical area, and to avoid the use of interproximal brushes or floss in the area for 7-10 days.
- Schedule follow-up visits to monitor healing, ensure stable gingival margins, and assess restoration readiness.

## Sample Recorded Treatment of Soft and Hard Tissue Crown Lengthening Using LIGHTMED's SAPPHIRE Dental Laser

Video can be found here: <https://youtu.be/ZuNu3eYPplk>

### Laser Settings:

- Select "Crown Lengthening" preset parameter on soft tissue of the panel
- Set laser settings to 150mJ (1.5W), 10Hz and Water Level 3
- Use SAPPHIRE Dental Laser Tip ST200 (LIGHTMED SKU #A00923)

### Soft Tissue Removal with Hard Tissue Contouring

- First, the gingivectomy is performed to remove the papilla between #18 and #19. Use the tip in a "back and forth" motion with quick sweeps, and in very close proximity or in contact with the tissue.
- Note that the gingivectomy should be planned to preserve at least 1.5-2mm of keratinized tissue to avoid periodontal issues in the area.
  - The papilla is first de-epithelialized buccally, and then the underlying soft tissue is removed, including interproximal soft tissue and lingual papilla, exposing the underlying bone.
  - Clinically confirm that soft tissue has been removed and underlying bone is clearly visible.
  - During examination, ensure there are no tissue tags.
- The laser is used in a "back and forth" motion, without lingering in one site for more than a couple of seconds, always under copious irrigation and air cooling to avoid overheating.
- Use the tip parallel to the long axis of the teeth to avoid damaging the pulp, and carbonization of tooth structure.

### Review Hard Tissue Contouring Depth

- To perform the ostectomy and osteoplasty, use the laser with the same technique: quick "back and forth" sweeps to avoid overheating the hard and soft tissues, and use the tip parallel to the long axis of the teeth.
- Remove any remaining tissue tags.
- Once satisfied, proceed with the coagulation phase.

# Treatment Guidelines for Gingivectomy and Crown Lengthening

## Sample Recorded Treatment of Coagulation Using LIGHTMED's SAPPHIRE Dental Laser

Video can be found here: <https://youtu.be/izgaVTscPF0>

### Laser Settings:

- Select “Coagulation” preset parameter on soft tissue of the panel
- Set laser settings to 30-50mJ (0.5W), 10Hz and Water Level 0
- Use SAPPHIRE Dental Laser Tip ST200 (LIGHTMED SKU #A00923)

No irrigation or air cooling is used during the coagulation phase and the laser tip is used with a similar technique – the tip does not directly contact the area, but it moves in a “back and forth” motion that stimulates blood clot formation. A thicker, gelatinous-like blood clot is obtained compared to a naturally formed one.

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