

# Bone Grafting & Guided Bone Regeneration

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## Description:

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### # Bone Grafting & Guided Bone Regeneration

Jawbone is not a static structure. It responds dynamically to the forces placed upon it by teeth and the biological signals from the periodontium. When teeth are lost, or when advanced gum disease destroys the bone that anchors them, that bone recedes and shrinks — a process called resorption. Bone grafting is the clinical discipline of rebuilding lost or deficient bone to restore the foundation for either existing teeth or dental implants.

At Collins Street Specialist Centre, our specialist periodontists perform bone grafting procedures across the full spectrum of complexity: from small localised regenerative procedures around compromised teeth to substantial ridge augmentation in preparation for implant placement.

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### ## What Is Bone Grafting?

Bone grafting involves placing bone graft material into an area of bone deficiency, providing a scaffold and biological stimulus for new bone formation. Over a period of months, the graft incorporates into the patient's own jawbone, producing solid, vascularised bone tissue capable of supporting teeth or implants.

**\*\*Guided Bone Regeneration (GBR)\*\*** is a specific technique used in conjunction with bone grafting. A barrier membrane — made from resorbable collagen or a non-resorbable reinforced material — is placed over the graft to prevent faster-growing soft tissue from infiltrating the site before bone has had the opportunity to form. This "guided" approach directs the regenerative process toward bone rather than fibrous tissue.

Bone graft materials come from several sources:

- **\*\*Autograft (patient's own bone):\*\*** Harvested from elsewhere in the mouth or jaw (chin, ramus). Considered the biological gold standard due to the presence of living bone cells, but involves a second surgical site. - **\*\*Allograft (donor bone):\*\*** Processed human bone from a registered tissue bank.

Processed to remove cellular material while preserving the mineral scaffold. Widely used and well-documented. - **Xenograft (animal-derived bone):** Most commonly bovine (bovine hydroxyapatite). Provides an excellent long-lasting scaffold. Extensively studied and broadly accepted in clinical practice. - **Alloplast (synthetic):** Calcium phosphate or bioactive glass materials. No risk of disease transmission.

In practice, grafts are often a blend of materials selected to balance biological signalling with scaffold longevity. Growth factors derived from the patient's own blood (platelet-rich fibrin, or PRF) are sometimes incorporated to accelerate healing.

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## ## When Might You Need Bone Grafting?

Bone grafting is commonly indicated when:

**Before or during implant placement:** - Bone volume at the intended implant site is inadequate in width, height, or both - A tooth was extracted long ago and the ridge has resorbed - A tooth has been lost to severe infection, leaving a large bony defect - Simultaneous (socket preservation) grafting is placed at the time of extraction to prevent future resorption

**In periodontal regenerative surgery:** - Advanced periodontitis has created bony craters or defects adjacent to teeth that are worth saving - Regenerative surgery aims to rebuild the bone-tooth attachment, potentially reversing some of the damage caused by infection

**After trauma or pathology:** - A cyst, tumour, or traumatic injury has resulted in a bony defect requiring reconstruction

**In conjunction with OMS procedures:** - For major jaw reconstruction, the oral and maxillofacial surgery team collaborates with our periodontists. See [Bone Grafting (OMS)](oral-maxillofacial-surgery/bone-grafting-oms/).

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## ## What to Expect: The Bone Grafting Process

### ### Consultation and Planning

Your specialist will take a detailed medical and dental history and review any existing X-rays. In most cases, cone-beam CT imaging (Planmeca ProMax 3D) is used to produce a three-dimensional reconstruction of the deficient area, allowing precise quantification of bone deficit and planning of graft volume and dimensions.

For implant-related grafting, digital implant planning software (coDiagnostiX) allows your specialist to plan the final implant position and work backwards to determine exactly what bone architecture is required — ensuring the graft is designed around the prosthetic endpoint.

### ### The Procedure

Bone grafting is performed under local anaesthesia, supplemented with intravenous sedation for more anxious patients or complex cases. The procedure typically involves:

1. An incision in the gum to expose the deficient bone
2. Thorough debridement of the bony defect (removal of any infected or fibrous tissue)
3. Preparation of the host bone surface to encourage vascular ingrowth
4. Placement of graft material in layers, shaped to restore the required contour
5. Positioning of a barrier membrane over the graft (in GBR procedures)
6. Careful wound closure with sutures designed to maintain space and protect the graft

Where laser assistance is employed (Fotona LightWalker or VersaWave laser), the graft site can be decontaminated and the surrounding soft tissue managed with greater precision and reduced bleeding.

Surgical time varies from approximately 45 minutes for a simple localised graft to 2–3 hours for more extensive ridge augmentation.

### ### Healing and Graft Maturation

Bone regeneration is not rapid. Following grafting:

- Initial soft tissue healing occurs over 2–4 weeks - Early bone formation begins within the graft over the following 2–3 months - Graft maturation — the consolidation of new bone to load-bearing quality — typically takes 4–9 months for smaller grafts, and potentially longer for major augmentations

Most implant placement is deferred until graft maturation is sufficient, confirmed by follow-up CBCT imaging. In selected cases, implants can be placed simultaneously with bone grafting.

### ### Socket Preservation (Ridge Preservation)

A specific and increasingly common application of bone grafting is socket preservation, also called ridge preservation, performed at the time of tooth extraction. When a tooth is removed, the surrounding bone naturally resorbs over the following months. Placing graft material into the fresh socket at the time of extraction dramatically reduces this resorption, maintaining ridge dimensions for future implant placement. This is a relatively straightforward procedure that can significantly simplify subsequent implant surgery.

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### ## Recovery and Aftercare

Recovery after bone grafting is generally more involved than simpler periodontal procedures:

- **Swelling and bruising** are expected, typically peaking at 48–72 hours and largely resolving within 7–10 days - **Soft diet** for 2–4 weeks depending on graft size and location - **Analgesics** (usually over-the-counter, supplemented with prescription medication for the first few days) - **Antibiotics** are routinely prescribed to protect the graft during early healing - **Antibacterial mouthwash** (chlorhexidine) for the first 2–4 weeks - **No smoking** — smoking is one of the most significant risk factors for graft failure; patients are strongly advised to cease smoking before and after surgery - **Avoid dislodging the graft site** — no vigorous rinsing, no straws, no probing the area with your tongue

Sutures are typically removed at 2 weeks. Follow-up imaging at 4–6 months assesses graft integration.

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### ## Why See a Specialist Periodontist for Bone Grafting?

Bone grafting sits at the intersection of surgical skill, biological understanding, and long-term treatment planning. The outcomes depend significantly on:

- Correct selection of graft material and membrane for the specific defect morphology - Surgical technique — particularly wound closure, which is critical for membrane-protected sites - Integration with the overall implant or periodontal treatment plan

Specialist periodontists complete focused postgraduate training in regenerative procedures that general dentists do not receive. The differential in complication rates and predictability between specialist and non-specialist grafting outcomes is well documented in the periodontal literature.

At CSSC, bone grafting procedures are performed by periodontists who collaborate seamlessly with prosthodontists (for prosthetic planning) and the oral and maxillofacial surgery team (for major

reconstruction). The result is a grafting strategy designed from the outset around the final clinical goal.

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## ## Our Specialists

CSSC periodontists performing bone grafting procedures work from Level 12 & Tower, Manchester Unity Building:

- **Dr Simon Hinckfuss** — Specialist Periodontist and Specialist Prosthodontist. His dual registration allows integrated planning of bone augmentation and the prosthetic restoration that follows. - **Dr James van den Berg** — Over 25 years of specialist implantology experience, including complex bone augmentation and laser-assisted regenerative surgery. - **Dr Ahmed El Hadidi** — Specialist Periodontist performing hard and soft tissue grafting with an evidence-informed approach informed by precision medicine research. - **Dr Peishan Jiang** — Specialist Periodontist with expertise in bone grafting, sinus lifts, and periodontal regeneration, with active interests in translational dental research.

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## ## Related Treatments

- **[Gum Disease Treatment](/periodontics/gum-disease/)** — The underlying condition that bone grafting often addresses as part of periodontal regenerative surgery. - **[Dental Implants (Periodontics)](/periodontics/dental-implants-perio/)** — Bone grafting is frequently the prerequisite step for successful implant placement. - **[Sinus Lift](/periodontics/sinus-lift/)** — A specialised form of bone augmentation for the upper posterior jaw. - **[Gum Grafting](/periodontics/gum-grafting/)** — Soft tissue augmentation, often performed alongside or after bone grafting. - **[Bone Grafting (OMS)](/oral-maxillofacial-surgery/bone-grafting-oms/)** — Major jaw reconstruction performed by our oral and maxillofacial surgery team. - **[Implant Prosthetics (Prosthodontics)](/prosthodontics/dental-implants-prostho/)** — The restoration phase that follows bone augmentation and implant placement.