Flaps and Grafts

To help ensure national coding consistency, the following definitions of terms that are used in relation to flaps and grafts and to interventions involving flaps and grafts have been prepared to help you select the correct *Canadian Classification of Health Interventions* (CCI) qualifier.

Interventions

Excision

In CCI, an excision is classified to Excision partial (87), Excision partial with reconstruction (88), Excision total (89), Excision total with reconstruction (90), Excision radical (91) or Excision radical with reconstruction (92). The “deepest site” rule applies to excisions. The concept of deepest site (among others) is used by CCI to classify interventions for conditions that extend into other anatomy sites. The deepest site pertains to the innermost (situated farthest from the outside) site in the body that is being operated on. The anatomy site group that is selected to classify an intervention for a condition that extends into another anatomy site(s) may be based on the deepest anatomy site on which the intervention is performed. This site may be different from the one in which the condition originates. An excision of a lesion of the skin that extends into the soft tissue is classified to excision of soft tissue of the anatomy site. An example is 1.EQ.87.^^ *Excision partial, soft tissue of head and neck*.

Wide excision

A wide excision, also known as a wide local excision, is removal of the lesion along with a margin of normal-appearing tissue that surrounds the lesion. In CCI, a wide excision is classified to Excision partial (87).

Wedge excision

A wedge excision is removal of a triangular-shaped piece of tissue, which includes the lesion as well as a small amount of normal-appearing tissue that surrounds the lesion. In CCI, a wedge excision is classified to Excision partial (87).

Procurement

Procurement is retrieval of tissue from one (donor) site to repair a defect at another (local or distant recipient) site. It is also known as “harvesting.” The harvesting of tissue and organs is captured by the generic intervention Procurement (58) for the site from which the tissue was obtained. Procurement can be performed on a deceased donor or a living donor. Procurement of a patient’s own tissue for use during

the current intervention episode is captured only when a separate incision is required to obtain the tissue for grafting. The procurement site then becomes another operative site requiring care and having potential for complications.

Tissue options

When direct closure of a wound is not possible, there are several options available to the surgeon to repair a defect, whether surgically or traumatically created. Numerous types of tissue are employed as part of an intervention, including skin, fat, bone, cartilage, omentum, dura, muscle, nerve and synthetic tissue; however, in CCI, tissue options are not based on the type of tissue that is used but rather on the **source** of the tissue (e.g., one's own body, an animal, synthetic, cultured) and whether the tissue is a **graft or flap**. Although some clinicians use the terms "flap" and "graft" interchangeably, the classification clearly distinguishes between them.

The tissue qualifier is a component of the CCI code. It is 1 character, positioned in field 6 of the CCI code, and is used to capture the type of tissue used in an intervention. At rubrics where tissue may be required to repair or reconstruct a defect (due to trauma or previous surgery), or to complete a closure, options are available for the types of tissue that are typically employed at that site.

Flaps versus grafts

Flaps

A flap is tissue procured that includes the blood and nerve supply. It is usually cut on 3 sides, leaving the fourth side attached to the blood and nerve supply of the procurement site. When it is completely excised from the procurement site, microvascular anastomosis is required to attach it to the recipient site.

The key features of a flap (versus graft) are that

- The tissue is always from the patient's own body; and
- It retains its own blood supply.

Local flaps (CCI tissue qualifier E)

A local flap is tissue that is procured in the immediate vicinity of the defect where the repair is needed. When direct closure of a wound is impossible due to its size or shape, a local flap may be used. With a local flap, tissue that is **adjacent** to (adjoining) the defect in need of coverage is cut on 3 sides, leaving the fourth side attached to its blood supply. The procured tissue is then moved into position, leaving the fourth side intact. Types of local flaps are based on the technique used to transfer them and include advancement flaps, V-Y advancement flaps, transposition flaps, Z-plasties and rotation flaps. The most frequent types of tissue used for local flaps are skin, mucosa and omentum.

Table Examples of local flaps

Flap	Description
Advancement flap	A local flap that is moved to the site of the defect using a sliding technique.
V-Y advancement flap	A local flap whereby the length of the flap is increased by making an incision shaped like a "V." The tissue is then stretched and sutured into the defect in the shape of a "Y."
Transposition flap	A type of local flap in which the tissue is stretched and repositioned to repair the defect.
Z-plasty	A transposition local flap that combines components of an advancement flap and a rotation flap. 2 triangular flaps are created by the "Z" incision and are transposed or rotated so that the apex of each flap fits into the defect at the base of the opposite flap. This technique redistributes the tension on the wound and results in a less-noticeable scar. The scar is broken up into smaller units, camouflaging a wound that crosses relaxed skin tension lines or Langer lines that correspond to collagen fibers within the dermis. For example, a Z-plasty is often used to repair a linear wound that crosses the vermillion border or the medial canthus.
Rotation flap	A type of local flap in which the width or length and the mobility of the flap are increased by using curved incisions and counter-incisions. The tissue is rotated and stretched to repair the defect.

Free flaps (CCI tissue qualifier F)

A free flap is tissue that is raised (dissected away from surrounding tissue) on its vascular pedicle (main blood vessels come with it), is **detached** from the procurement site and is relocated to the defect in need of coverage. These flaps, which include vessels — at least one vein and one artery — are then joined to the blood vessels at the recipient site by microvascular anastomosis to allow revascularization. A free flap may also be referred to as composite free flap, fasciocutaneous flap, fibular flap, interpositional intestinal flap, island flap or random flap. An example of a free flap is a tarsoconjunctival flap (from the opposite eyelid) for eyelid reconstruction.

Pedicled (distant or regional) flaps (CCI tissue qualifier G)

A pedicled flap is one that is procured a **distance** from the defect in need of coverage. The tissue is left attached to the procurement site by a pedicle (stalk) that supplies the tissue with blood. A pedicled flap may need to be split (divided) so that it can reach the distant site where it is being placed. Source documentation may refer to "tunnelling" of the flap, which is a means whereby the flap is passed internally through a channel from the point of procurement (where the pedicle is intact) to where it will be transposed. Once a new blood supply has been established where the flap has been inset, the pedicle may be severed. An example of the use of a pedicled graft is a coronary artery bypass graft (CABG) that employs a pedicled internal mammary artery. A pedicled flap may also be referred to as a composite flap, a musculocutaneous flap, a myocutaneous flap, a regional flap, a muscle rotation flap, a muscle transposition flap, a latissimus dorsi myocutaneous flap (LDM) or a trans rectus abdominis muscle flap (TRAM).

Tip: Do not confuse the routine "raising (elevation) of a flap" or "flap approach" that is done to gain access to the operative site with an intervention to obtain tissue from one site and transpose it to another site. Routine raising of a flap is an inherent part of many interventions, whereas a flap approach is a type of approach (qualifier 1) that is used with some interventions (e.g., interventions on the brain).

Grafts

A graft is tissue procured that does not include the blood and nerve supply. It includes the epidermis and some or all of the dermis.

The key features of a graft (versus flap) are that

- The tissue may come from any source (e.g., self, animal, man-made); and
- It does not have its own blood (or nerve) supply.

Autograft (CCI tissue qualifiers A, B)

An autograft is tissue that is moved (grafted) from one location to another in the **same individual**. An autograft may be described as a full-thickness or split-thickness skin, fat, fascia, cartilage, bone or nerve graft. Autografts have 2 tissue values: **A** autograft; and **B** split thickness. A full-thickness graft is procurement of the epidermis and the full depth of the dermis. A split-thickness graft is procurement of the epidermis and some of the dermis. It is described as "thin," "intermediate" or "thick" depending on the thickness of the dermis procured. An autograft may also be referred to as autologous tissue.

Tip: Tissue value **A** autograft can have a user-friendly description of "full thickness" at any given rubric. An autograft that is not otherwise specified is a full-thickness graft.

Homograft (CCI tissue qualifiers I, J, K, M)

A homograft is an organ or tissue procured **from a human donor** and moved (grafted) **to a human recipient**. A homograft may be used promptly after procurement or following preservation in a tissue bank. Homografts have 4 tissue values: **I** homograft from a related donor; **J** homograft from a living donor; **K** homograft NOS; and **M** homograft that has been purged to destroy malignant cells. A homograft may also be referred to as an allograft, allogeneic organ or homologous tissue.

Xenograft (CCI tissue qualifier L)

A xenograft is an organ or tissue procured **from an animal source** (e.g., porcine [pig] valve, bovine [cow] bone tissue) and moved (grafted) **to a human being**. A xenograft may also be referred to as a heterograft, heterologous graft or heteroplastic graft.

Cultured tissue (CCI tissue qualifier P)

Cultured tissue is tissue or cells that are **propagated in vitro** (grown in an external environment in special media conducive to their growth) and then transferred for use. An example of the use of cultured **tissue** is cultured skin that is grafted in place to treat burns. An example of the use of cultured **cells** is hepatocyte (liver cell) propagation and transplantation (injection) for patients with liver disease.

Synthetic tissue (CCI tissue qualifier N)

Synthetic tissues are **man-made materials** that are used to replace tissue (fill a defect or join sites) and often also to encourage tissue regeneration. The particular materials that are used and their form depend on the tissue being replaced and the functionality required. Synthetic tissues include silicone tubing that serves as a conduit to bridge the gap between a severed nerve; bone paste, an osteoconductive bone substitute, used to fill gaps and defects in bone; and mesh, a woven or knitted fabric made of plastic or metal, used, for example, to reinforce hernia repairs.

Composite graft (CCI tissue qualifier D)

This tissue qualifier is specific to xenograft with synthetic tissue.

Combined sources of tissue (CCI tissue qualifier Q)

This value is selected when a particular repair employs the use of any combination of the types of tissue above (e.g., any flap with any graft; bone graft [A] with bone paste [N]).

Additional resources

- Canadian Coding Standards: *Procurement or Harvesting of Tissue for Closure, Repair or Reconstruction*
- *CCI: A Guide to Intervention Code Assignment*
- CCI Folio Views: Appendix A — CCI Code Structure, Qualifier 3, Section 1, Tissue

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How to cite this document:
Canadian Institute for Health Information. *Flaps and Grafts* [job aid]. Ottawa, ON: CIHI; 2022.