

Swan-Neck Deformity of the Finger

Swan-neck deformity: the middle joint (PIP) hyper-extends while the fingertip (DIP) bends down, giving the finger its swan-neck shape.

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What you're feeling

You may have noticed that one or more of your fingers has taken on an odd shape. The middle joint of the finger (the big knuckle in the middle, not the one at the base) bends backwards so the finger looks slightly arched or “swan-like,” while the small joint nearest the fingernail droops forwards. Side on, the finger makes a shallow zig-zag.

Early on this may be more of a nuisance than a pain: the finger can feel like it gets “stuck” or snaps as you try to bend it, and it can be hard to make a smooth fist or grip small objects. As it becomes more fixed, the finger may no longer straighten or curl the way it used to, and everyday tasks (doing up buttons, picking up coins, gripping a pen) become fiddly and tiring. Some people first notice it simply because the finger catches when they reach into a pocket or a glove.

What's actually happening

Your finger is balanced by a clever system of tendons and small ligaments that run along the top, bottom and sides of each joint. The middle joint (the PIP joint) is normally stopped from bending backwards by a tough little ligament on its palm side called the **volar plate**, and by tendon bands that sit along the sides of the finger.

In a swan-neck deformity that balance is lost. If the volar plate becomes loose, or the side-tendons (the lateral bands) slip up onto the top of the joint, the middle joint is pulled back into hyperextension, and because the tendons are all connected, the tip of the finger is dragged into a droop. The two go together.

There are several reasons the balance can fail. Sometimes it starts at the fingertip: an untreated **mallet finger** (a dropped fingertip after a tendon injury) shifts the pull of the tendons and slowly tips the middle joint backwards. Often it is driven by **inflammatory arthritis**, especially **rheumatoid arthritis**, which stretches

and weakens the ligaments. It can also follow loose-jointedness, old injuries, or conditions that increase muscle tightness. Whatever the trigger, the end result is the same recognisable shape.

What we can do about it

Dr Kieran Hirpara leads our upper-limb service at Mater Private Hospital Rockhampton, where we guide patients from initial referral through to a clear management plan. Your journey begins with a thorough clinic assessment to confirm the diagnosis and understand how your finger is moving. We typically start with non-operative care for long-standing issues and consider surgery only when that approach has not provided enough relief.

The right treatment depends on how flexible the finger still is and what is driving it, so the first step is always a proper hand assessment and treating any underlying arthritis.

If the finger is still supple and the joint can be straightened and bent freely, we often start without surgery. A small, custom **figure-of-eight splint** (sometimes a neat silver-ring style splint) sits across the middle joint and quietly blocks the backward bending while still letting the finger work. Many people manage very well this way, and hand therapy helps keep the joints moving.

If splinting isn't enough, or the finger is becoming stuck, surgery can re-balance it. There are several well-established options, chosen to fit your finger: re-tethering the middle joint with a slip of one of your own tendons so it can no longer snap backwards (a **tenodesis**); tightening the loose ligament on the palm side; or moving the slipped side-tendons back where they belong. If the joint surface itself is worn out and stiff (common in long-standing arthritis) we may instead fuse the joint into a good working position or, in selected cases, replace it.

What to expect

Caught early, while the finger is still flexible, the outlook is good; a splint or a re-balancing operation can restore a much more useful, smoother finger. The more rigid and arthritic the joint becomes, the more limited the options, which is exactly why it's worth being seen before the finger sets in one position.

If you have surgery, expect a period in a splint and a course of hand therapy afterwards to retrain the finger and protect the repair; this rehab is a real part of the result, not an optional extra. Where an underlying arthritis is the cause, keeping that well controlled with your rheumatology team protects the other fingers from going the same way.

When to see someone

- A **fingertip that droops** and won't fully straighten after a knock or jamming injury (a **mallet finger**); treating this early can head off a swan-neck later.

- A finger that is starting to **arch backwards at the middle joint**, or that catches, snaps or locks when you bend it.
- **Increasing stiffness**, or a finger that no longer makes a smooth fist.
- Known **rheumatoid or inflammatory arthritis** with changing finger shapes: worth reviewing before the deformity becomes fixed.

In more depth

This section goes further than you need for your own treatment decisions. Swan neck deformity is worth the extra reading because it is not one condition – the same finger shape arises from several different failures, at both ends of the finger, and the correct treatment depends entirely on which one started it.

ONE SHAPE, SEVERAL CAUSES

A swan neck finger hyperextends at the middle joint and drops at the fingertip. That posture is the end state of an imbalance in a linked system, and the initiating fault can sit at either end.

From the fingertip. An untreated mallet injury leaves the extensor mechanism detached distally [1]. The extensor force it no longer delivers to the fingertip is transmitted instead to the middle joint, which is progressively pulled into hyperextension. A swan neck can therefore be the late consequence of an injury weeks or months earlier that appeared to involve only the fingertip.

From the middle joint. If the volar plate – the thick ligament preventing the middle joint from hyperextending – is stretched or torn, the joint drifts backwards. The lateral bands then ride above the joint's axis and reinforce the extension, while the deep flexor tendon is left with slack that flexes the fingertip.

From generalised laxity or inflammatory disease. In hypermobility, the volar plate is constitutionally lax rather than injured. In rheumatoid arthritis, synovitis attenuates the restraints over time, and the deformity is usually part of a wider pattern across several fingers [3].

WHY THE DISTINCTION DECIDES THE TREATMENT

Treatment aims to stop the middle joint hyperextending, and the level at which it is corrected must match the level of the fault.

Where the deformity is driven from the fingertip, correcting the middle joint alone does not address the imbalance producing it. Where the volar plate has failed, a tenodesis using a slip of the superficialis tendon can be used to restrain hyperextension [2]. Where the cause is inflammatory, the underlying disease determines whether any reconstruction will hold – soft-tissue procedures in an actively inflamed hand tend to stretch out over time.

A silver-ring or figure-of-eight splint, which blocks the last few degrees of hyperextension while allowing the finger to bend, is often used first. It is more effective than it appears, because preventing that small range interrupts the mechanism driving the deformity.

FLEXIBLE VERSUS FIXED IS THE OTHER DECISIVE QUESTION

The second question is whether the finger can still be straightened passively. A flexible deformity – one that can be corrected by hand – may respond to splinting or soft-tissue rebalancing. A fixed deformity, where the joint no longer moves through its range, has established joint contracture and soft-tissue procedures alone will not correct it [4].

The practical implication is the same as for boutonnière deformity, and it is the reason both are worth showing to someone early: these are progressive, self-reinforcing deformities. The window in which a splint can hold a flexible finger straight is considerably wider than the window in which surgery can restore a fixed one.

A NOTE ON THE RELATED DEFORMITY

Boutonnière is in some ways the mirror image – middle joint bent, fingertip hyperextended – and arises from failure of the central slip rather than of the volar plate. The two are covered separately, and confusing them matters because the splinting positions are opposite.

REFERENCES

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