



**Health
Information
and Quality
Authority**

An tÚdarás Um Fhaisnéis
agus Cáilíocht Sláinte

Health Technology Assessment of Scheduled Procedures

Surgery for trigger finger/thumb

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Safer Better Care

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1 Surgery for trigger finger/thumb

1.1 Scope of this health technology assessment

This health technology assessment (HTA) evaluates the appropriateness and potential impact of introducing clinical referral/treatment thresholds for trigger finger/thumb release (hereafter referred to as trigger finger release), a routine scheduled surgical procedure within the publicly-funded healthcare system in Ireland. The effectiveness of trigger finger (TF) release may be limited unless undertaken within strict clinical criteria. This report is one of a series of HTAs of scheduled procedures. Details of the background to the request for the assessments from the Director General of the Health Service Executive (HSE), Mr Tony O'Brien, and the general methodology are included in the separate 'Background and Methods' document.⁽¹⁾

The scope of this HTA is to recommend clinical referral and treatment thresholds to be used in the assessment, referral and surgical management of patients for whom TF release is being considered. Input from an Expert Advisory Group as well as a review of international guidelines, international policy documents and thresholds, and economic evaluations were used to inform the referral criteria. In addition, the resource and budget impact were assessed where appropriate.

1.2 Surgical indications

Trigger finger (TF), also known as stenosing tenosynovitis or stenosing tenovaginitis, is a painful condition caused by the inflammation (tenosynovitis) or thickening and narrowing of the sheath of the flexor tendon of a finger such that the flexor tendon cannot glide freely through it.⁽²⁾ The sheath normally forms a pulley system. The first annular pulley (A1) at the metacarpal head is the most frequently affected pulley in TF.⁽³⁾ It can affect a single or several digits including the thumb (trigger thumb) and can result in pain and snapping, that is, triggering.⁽²⁾ Diagnosis is based on a history of locking or stiffness of the affected digit(s), tenderness in the palm of the hand at the base of the affected finger and an obvious clicking or locking of the affected digit during movement.⁽⁴⁾ If the condition worsens, the finger may get stuck in a bent position, then suddenly pop straight. Eventually, it may not straighten fully and instead become locked in flexion or extension. The severity of TF is defined as mild, moderate and severe as follows:^(2;4)

- Mild ('pre-triggering')
 - history of pain, catching or 'click'
 - tender A1 pulley; but fully mobile finger.

- Moderate
 - Triggering with:
 - A – difficulty actively extending finger
 - B – need for passive finger extension
 - loss of complete active flexion.
- Severe
 - fixed contracture.

The TF age distribution is bimodal, occurring mostly in young children under six years and in adults aged typically in their 50's and 60's (average age: 52-62 years),⁽⁴⁾ with women accounting for 75% of cases.⁽⁵⁾ Risk factors for adults include diabetes, hypothyroidism, rheumatoid arthritis, gout and renal failure.⁽²⁾ Although it has been associated with repetitive movement injuries, this finding has been questioned; the majority of TFs are thought to develop for reasons other than occupation.⁽⁶⁾ Carpal tunnel syndrome, de Quervain's tenosynovitis, or Dupuytren's contracture may occur concomitantly.^(3;7) The lifetime risk of TF is 2.6% in the general population, rising to 10% in patients with diabetes.^(2;7) In children, trigger digit represents a distinct condition that should be treated differently to adult-acquired trigger finger.^(8;9) More commonly, it affects the thumbs (90% of TF cases⁽⁷⁾) in children between the ages of six months and two years, causing a flexion deformity.⁽²⁾

1.3 Surgical procedures, potential complications and alternative treatments

Surgery or trigger finger release (TF release) involves surgical division of the A1 annular pulley of the flexor sheath of the digit using open, endoscopic or percutaneous techniques.⁽⁷⁾ In open TF release, an incision is made in the palm of the hand at the base of the affected digit.⁽⁸⁾ In percutaneous TF release, the surgeon inserts a needle at the base of the affected digit and uses this to divide the pulley. Percutaneous TF release can be performed with or without imaging – it is reported that imaging allows more precise surgery, but at an additional cost. Endoscopic TF release is performed by making two smaller incisions through which an endoscope is introduced to cut the pulley. Compared to open release it is reported to provide faster recovery from discomfort and faster return to normal daily and work activities, but at a higher cost per procedure. All three procedures are usually done as day cases under local anaesthetic⁽²⁾ and are typically short procedures (range seven to eleven minutes).⁽¹⁰⁾

In general, TF release is reported as safe and effective⁽³⁾ and can provide a permanent cure when performed by appropriately trained surgeons.⁽²⁾ Some patients require more extensive procedures to reduce the size of the flexor tendon;⁽¹¹⁾ for example, patients with rheumatoid arthritis and children with trigger thumb.⁽¹¹⁾ TF release is associated with a short recovery period (three to four weeks, depending on the approach used) and success rates ranging from 90% to 100%.^(3;4) Major complications are infrequent, but minor complications are relatively common, with rates of 3% and 28%, respectively, for open surgery.⁽¹²⁾ A 2013 systematic review and meta-analysis reported no difference in the overall rate of complications between open and percutaneous TF release.⁽¹³⁾

The management of TF is tailored to the severity and duration of symptoms. Non-surgical options include allowing spontaneous recovery over time or conservative treatment using splinting or local corticosteroid injection.⁽³⁾ These alternatives are described in the British Society for Surgery of the Hand (BSSH) guidelines.⁽²⁾

Spontaneous recovery may occur over time: in one series of trigger thumbs, 83% resolved over an average of seven months.⁽¹⁴⁾ Local injection of corticosteroid can be used as first line therapy and can be given in primary care;^(7;15) success rates for a single injection vary between 45% to 64% and depend on the follow-up time^(5;15;16) and patient condition (60% of diabetic patients successfully treated, but lower if multiple digits affected).⁽²⁾ A success rate of 86% is reported for a second injection.⁽¹⁷⁾ A Dutch trial (n=50 patients, part of a larger Groningen hand and wrist injection therapy trial) reported that corticosteroid injection therapy provided by a primary care provider is an effective and safe alternative to surgery with an initial beneficial effect lasting up to 12 months.⁽¹⁸⁾ Serious complications of steroid injection are rare; minor complications include, for example, flaring at the injection site.⁽¹⁵⁾ Application of a splint is indicated as a first line therapy for those unwilling to undergo corticosteroid injections. Reported success rates for splinting vary; for example, from 53%⁽¹⁹⁾ to 87%.⁽²⁰⁾

It is reported that non-steroidal anti-inflammatory drugs alone do not show any benefit other than temporary relief of pain in the palm.⁽⁷⁾ There is no evidence to suggest that workplace modification (ergonomic adjustments) or physiotherapy help in the management of work-related TF.⁽²⁾

In patients with diabetes, TF is less often responsive to conservative measures.⁽¹¹⁾ For example, the use of corticosteroid injections for the treatment of TF is reported as being potentially less effective in this cohort.⁽²¹⁾ TF release surgery is generally recommended if conservative management has failed (ongoing symptoms despite one to two local corticosteroid injection treatments), for those with severe symptoms,

and in those who are unlikely to benefit from corticosteroid injections (for example, patients with diabetes with several affected digits and severe symptoms).⁽²⁾

Specific considerations for the management of TF in children are noted in British Society for Surgery of the Hand (BSSH) guidelines, which report that TF can spontaneously resolve in up to 78% of children.^(2;22) There is evidence of spontaneous resolution after four years without the development of residual deformities.⁽²²⁾ Multiple studies have documented good outcomes for patients for whom surgical release was delayed up to four years after the onset of symptoms.⁽¹¹⁾ Recovery may also be assisted by splinting and passive stretching programmes.⁽²⁾ Non-operative methods of treatment include physiotherapy administered by the parents with or without a splint.⁽⁷⁾ Corticosteroid injections are not indicated and surgery is not required for mild cases with slight flexion deformity.⁽²⁾

1.4 Current practice in Ireland

Patients with TF, who are possible candidates for surgery, are generally referred for an outpatient consultant appointment by their general practitioner (GP). Referral or treatment thresholds (similar to those discussed in Section 2 below) may be used by GPs and surgeons to identify eligible candidates for referral or treatment. However, it is unclear what thresholds are currently being used and how consistently they are being applied. Corticosteroid injection of TF is provided by a limited number of GPs, with some onward referral from GPs to colleagues with a special interest in this area.⁽⁸⁾ It is reported that it is difficult to obtain access to specialist hand therapists in the primary care setting as there are limited numbers practising in Ireland. Access is reported to be variable, with average waiting lists of six weeks reported for routine occupational therapy and physiotherapy services and longer wait times for specialist services.⁽⁸⁾ Once accessed, typically a patient is seen once for assessment and application of a custom-made splint⁽⁸⁾ with conservative treatment (splint, exercise) recommended for six to ten weeks.^(8;11;20;23) The patient may need to be seen again after six to ten weeks if symptoms are not resolving.⁽⁸⁾

TF release is a routine, scheduled surgical procedure in the publicly-funded healthcare system in Ireland. The Hospital In-Patient Enquiry (HIPE) system reports that there were approximately 341 procedures undertaken in 2011. This data captures procedures provided as hospital day case and inpatient procedures; procedures provided in the outpatient setting are not captured and may therefore be underreported. TF release may be coded as the principal procedure or as a secondary procedure. For consistency and completeness, data are reported to include the principal and secondary procedures (i.e. 'all procedures') with all data presented on this basis. The International Classification of Diseases (ICD) intervention codes used to retrieve this data are listed in Table 1.1.

Table 1.1 HIPE ICD-10AM/ACHI list of intervention codes for trigger finger release

Intervention code	Description
46363-00	Release of tendon sheath of hand <i>Incision of tendon sheath of:</i> <ul style="list-style-type: none"> ■ hand ■ wrist <i>Release of:</i> <ul style="list-style-type: none"> ■ tendon sheath of wrist ■ trigger finger <i>Note: Performed for stenosing tenovaginitis</i>

Current data do not permit identification of the precise indication for which procedures are performed as the intervention and diagnosis codes are not linked. HIPE data capture the principal and up to 29 secondary diagnoses recorded in the patient medical notes for each episode of care. Table 1.2 outlines the most common principal diagnoses for patients who underwent TF release as a primary or secondary procedure in 2011. The data does not allow a breakdown of the type of TF release (i.e. open, percutaneous, endoscopic technique),⁽²⁴⁾ however, it is reported that open surgery is typically used in Ireland.⁽⁸⁾ As noted previously, concomitant TF and carpal tunnel syndrome, de Quervain's tenovaginitis, or Dupuytren's contracture may occur, thus explaining some of the other principal diagnoses listed.

Table 1.2 Principal diagnoses recorded in patients undergoing trigger finger release (HIPE data 2011)

Principal diagnosis	Code	Number of procedures	% of total procedures
Trigger finger	M653	230	67.45
Other congenital malformations of upper limb(s); including shoulder girdle	Q7409	56	16.42
Carpal tunnel syndrome	G560	15	4.4
Unspecified synovitis and tenosynovitis; hand	M6594	11	3.23
Radial styloid tenosynovitis [de Quervain]	M654	9	2.64
Other*	-	20	5.83

HIPE: Hospital In-Patient Inquiry (HIPE) Scheme.

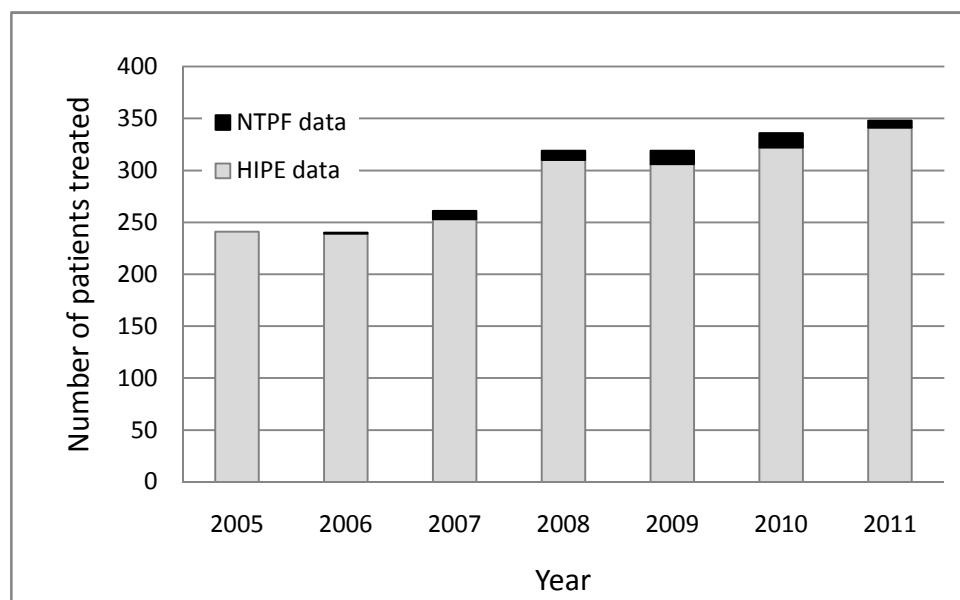
Data includes all activity in publicly-funded hospitals, including procedures in patients that used private health insurance. For consistency and completeness, data are reported to include the principal and secondary procedures (i.e. 'all procedures') with all data presented on this basis.

**Note: The remaining principal diagnoses contain five or fewer cases per diagnosis code.*

The number of TF releases undertaken in the publicly-funded healthcare system has increased moderately since 2005 (Figure 1.1). In addition to activity levels in public hospitals, TF release in private hospitals has also been procured for the public

healthcare system via the National Treatment Purchase Fund (NTPF).⁽²⁵⁾ Data on the total number of procedures undertaken in the publicly-funded system and including the additional procedures funded by the NTPF are shown in Figure 1.1.

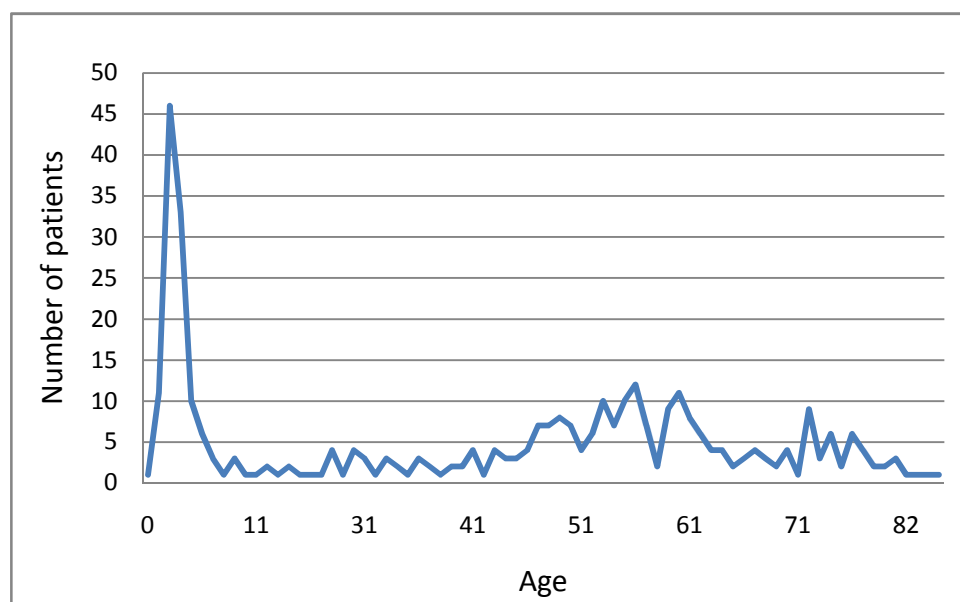
Figure 1.1 Number of trigger finger procedures provided through the publicly-funded healthcare system (2005 – 2011)



HIPE: Hospital In-Patient Inquiry (HIPE) Scheme; NTPF: National Treatment Purchase Fund. HIPE data includes all activity in publicly-funded hospitals, including procedures in patients that used private health insurance.

Source: HIPE data accessed via ESRI HIPE Online Portal 28 January 2013, NTPF activity data.

Thirty percent of TF releases in 2011 (n=107) were carried out in children less than five years-of-age and 33% in children less than 18 years-of-age (Figure 1.2).⁽²⁴⁾ As noted, corticosteroids are not indicated for TF release in those less than 18 years-of-age, possibly explaining the greater use of surgery in this group. HIPE data indicate that TF release is mainly undertaken (64%) by orthopaedic surgeons (including paediatric orthopaedic surgeons, 4%) and plastic surgeons (35%).⁽²⁴⁾ Table 1.3 provides a breakdown of activity by the proposed HSE hospital groups that were recently announced by the Department of Health.⁽²⁶⁾ This shows some variation across the hospital groups with fewer surgeries recorded in Dublin North East and the Midwest. Any variation may be explained by differing catchment sizes or the availability of an orthopaedic/plastic surgery service, hospital size or specialisation.

Figure 1.2 Age profile of trigger finger patients (2011)

HIPE: Hospital In-Patient Inquiry (HIPE) Scheme;

Source: HIPE data accessed via ESRI HIPE Online Portal 28 January 2013, NTPF activity data.

Table 1.3 HIPE data per proposed HSE hospital group (2011)⁽²⁶⁾

Hospital group	Number (%)	% day case
Dublin North East	18 (5)	95.8
Dublin Midlands	84 (23)	96.6
Dublin East	86 (24)	92.0
South/South West	82 (23)	86.9
West/North West	53 (15)	86.9
Midwest	14 (4)	100.0
Acute paediatric services, Dublin	24 (7)	95.9

Guidelines suggest that TF release may be performed safely in a day case setting.⁽²⁾ HIPE data indicate that 93% of TF releases in 2011 (80% in 2005) were undertaken as day case procedures with limited variation between regions.

The length of time a patient must wait to be reviewed varies according to the referral pathway and the individual hospital and consultant to which a patient is referred. At the end of August 2013, it was reported that there were 374,104 patients on the NTPF Outpatient Waiting List database, 58% of whom were waiting less than six months with 78% waiting less than 12 months.⁽²⁷⁾ Within orthopaedics, it was reported that as of August 2013 there were 52,455 patients on the waiting list, 45% of whom were waiting less than six months and 67% waiting less than 12 months.⁽²⁷⁾ Initiatives are underway by the HSE to standardise the management of outpatient services and to ensure that there are consistent management processes across all

publicly-funded healthcare facilities that provide outpatient services. This includes the publication of a protocol for the management of these services by the NTPF in January 2013 which provides the core guidance for the Outpatient Services Performance Improvement Programme.⁽²⁸⁾ The protocol specifies that patients should be treated based on clinical urgency, with urgent referrals seen and treated first. It is intended that the definition of clinical urgency and associated maximum wait times is to be developed at specialty or condition level and agreed by the National Clinical Programmes. Initiatives are also underway by the Orthopaedic and Rheumatology Clinical Programmes in the HSE to develop interface clinics and consultations between primary and secondary care services in Ireland and to implement agreed national referral guidelines for all patients with musculoskeletal disease.

In January 2013, the NTPF published a national waiting list management policy that outlines the standardised approach to managing scheduled care treatment for inpatient, day case and planned procedures in all publicly-funded hospitals. It outlines a consistent structured approach that must be adopted to the management of the waiting list; monitoring of the implementation of the policy will be routinely undertaken by the NTPF in the form of annual quality assurance reviews.⁽²⁹⁾ As of May 2013 there were 35 patients waiting for surgery for trigger finger, 74% of whom had been waiting less than six months.⁽³⁰⁾ Based on data submissions from 44 hospitals, average patient waiting time for TF release is reported to vary from less than two weeks to seven months for adults, with a maximum wait of two months reported for children.⁽³¹⁾

2 Clinical referral/treatment threshold

2.1 Review of the literature

A comprehensive review of the literature was conducted during May 2013 to identify international clinical guidelines, health policy documents describing treatment thresholds that are in place in other health systems, and economic evaluations for TF release. The approach and general search terms are described in Appendix 1 in the Background and Methods document;⁽¹⁾ a summary of the results is included in Table 2.1.

Table 2.1 Included evidence sources to inform clinical referral thresholds

Publication Type	Number	References
Clinical guidelines	2	(2;32)
Systematic reviews	1	(13)
Clinical studies	3	(17;33;34)
Cost-effectiveness studies	3	(33;35;36)

2.2 Clinical evidence

A comprehensive review of the literature retrieved two guidelines for TF management from the British Society for Surgery of the Hand (BSSH)⁽²⁾ and the American College of Occupational and Environmental Medicine (ACOEM).⁽³²⁾ The BSSH recommendations include surgical TF release for severe or failed non-operative treatment where severe is described as 'fixed contracture'. Specifically it states that 'TF release is indicated in adults:

- after failed conservative treatment
- for recurrent triggering after one to two injections of steroid
- if there are severe symptoms at presentation
- in populations who are unlikely to benefit from steroid injections (for example a diabetic with many digits affected and severe symptoms).'

Non-surgical interventions recommended for adults are: spontaneous recovery (which may occur with time in mild cases); analgesia; and corticosteroid injections to the flexor sheath for moderate cases. Splinting is suggested as an alternative therapy for those unwilling to contemplate corticosteroid injection or surgery. It states that no effect is demonstrated for non-steroidal anti-inflammatory drugs (except for simple analgesia), placebo injection or work place modifications.⁽²⁾

The BSSH guidelines recommend that in paediatric trigger thumb:

- spontaneous recovery may be assisted by splinting and passive stretching programmes
- surgical release of the A1 pulley of the flexor sheath of the thumb is almost always successful with no ideal age for surgery. Timing is determined by the severity of the flexion deformity, the duration of the problem and the parent attitude to a 'wait and see' policy in the hope of spontaneous recovery. Surgery is typically performed by the age of three years, with some literature suggesting five years.

The ACOEM recommends the following:

- education for select patients (insufficient evidence)
- splints for select cases (i.e. patients who decline injection) of acute, subacute, or chronic flexor tendon entrapment (insufficient evidence)
- glucocorticosteroid injections for acute, subacute, or chronic flexor tendon entrapment (strongly recommended)
- open release for persistent or chronic flexor tendon entrapment. Percutaneous release is a reasonable option (moderately recommended).

A systematic review published in 2013 compared percutaneous release, open surgery and corticosteroid injection for trigger digits (adults only).⁽¹³⁾ It reported on seven randomised controlled trials (RCTs) involving 676 patients and compared results using a fixed meta-analysis model. Four RCTs compared percutaneous release to open surgery,^(17;37-39) four compared percutaneous release to corticosteroid injection,^(17;40-42) and one RCT compared all three treatment types.⁽¹⁷⁾ The meta-analysis predicted that frequencies of treatment failure and complications were no different between percutaneous release surgery and open surgery for trigger digit in adults. Patients treated with percutaneous release were less likely to have treatment failure than patients treated with corticosteroid injections. See Appendix 1 for details.

A retrospective review published in 2006 compared corticosteroid injections to surgery in the management of TFs (adults only). It reported that 89 digits received more than one corticosteroid injection of which 46 (52%) resolved completely and 42 (47%) were improved.⁽³⁴⁾ In comparison, surgical treatment was successful in 71 of 72 (99%) digits. No side effects of corticosteroid injection were noted. Short-term post-operative side effects were noted in 26 of 72 surgical patients (36%).

An RCT in 2012 compared the effectiveness of corticosteroid injection (n=49 patients), percutaneous release (n=45 patients) and open surgery (n=56 patients) (adults only).⁽¹⁷⁾ The authors reported that the trigger cure rate for patients in the injection method group was 57%; if two injections were required and administered, this increased the cure rate to 86%. For the percutaneous and open release methods, remission of the trigger was achieved in all cases. It concluded that percutaneous and open surgical methods displayed similar effectiveness and proved superior to the conservative injections regarding the trigger cure and relapse rates. A further RCT in 2011 compared the results of surgery and injections in 105 trigger digits in 95 patients (surgery: n=46 digits, injections: n=59 digits) at one and six months.⁽⁴⁰⁾ At six months six recurrences (11%) occurred in the steroid injection group and none in the percutaneous release group ($p = 0.005$).

A study in 1997 retrospectively reviewed 109 TFs in 102 patients with respect to management plan and response to treatment (adults only).⁽³³⁾ Thirty-four digits eventually underwent surgical release of the A1 pulley; 75 digits were treated with local corticosteroid injection only. All patients were evaluated with respect to clinical resolution of symptoms, cost of treatment, and general satisfaction as measured with a post-treatment questionnaire. It reported that surgical management may be the next best option in patients with TF who continue to be symptomatic after a single injection.⁽³³⁾

No further systematic reviews were retrieved that compared surgical to nonsurgical treatments. However, several studies were retrieved that looked at the effectiveness of corticosteroid injections (adults only). For example, a Cochrane review (two 'poor quality' RCTs) published in 2009 assessed corticosteroid injections for TF in adults.⁽¹⁵⁾ It reported that corticosteroid injection with lidocaine was more effective than lidocaine alone for treatment success at four weeks with no adverse events or side effects reported. In 2007, a systematic review (four prospective RCTs) was published that assessed the effectiveness of corticosteroid injections in the treatment of TF.⁽⁵⁾ A combined analysis of the four studies showed that corticosteroid injections are effective in 57% of patients. A prospective review of the prognostic indicators of recurrence following corticosteroid injection at one year found that 56% of the digits (n=124 trigger digits) had a recurrence of symptoms. Younger age, insulin-dependent diabetes mellitus, involvement of multiple digits, and a history of other tendinopathies of the upper extremity were associated with a higher rate of treatment failure. Symptoms often recurred several months after the injection.⁽⁴³⁾

Two ongoing studies were retrieved. The first is a double-blinded RCT that commenced in January 2013 and aims to test the hypothesis that an improved outcome can be achieved by employing corticosteroid injection simultaneously with percutaneous release compared to conventional percutaneous release alone.⁽⁴⁴⁾ The estimated completion date is January 2014. Also, a Cochrane protocol published in 2012 describes a systematic review that will evaluate the effectiveness and safety of different methods of surgical treatment for TF (open, percutaneous or endoscopic approaches) in adults at any stage of the disease.⁽⁴⁵⁾

In the UK, clinical services were historically commissioned at a local level by 146 primary care trusts (PCTs) who were charged with service delivery for the National Health Service (NHS). In April 2013, the PCTs were disbanded and their responsibilities taken over by Clinical Commissioning Groups (CCG) and the NHS Trust Development Authority. Many of these PCTs generated referral and treatment thresholds for elective surgeries (including trigger finger release) that were linked to the funding of these interventions and have been subsequently adopted by several

new CCGs. These criteria are generally evidence based and are consistent with the BSSH guideline. Examples of criteria from three PCTs and a CCG are included in Appendix 2. These policies identify interventions that are 'not normally funded' or that must meet specified criteria for funding to apply.

2.3 Cost-effectiveness evidence

There is a lack of evidence examining the cost-effectiveness of introducing referral and treatment criteria for trigger finger release. Additionally, due to differences in treatment setting and costs, this evidence may not be transferable to an Irish setting.

A 2009 prospective economic analysis (cost-minimisation study) in the UK compared the cost of providing TF release surgery in an outpatient clinic instead of a traditional operating theatre setting.⁽⁴⁶⁾ The study excluded surgical personnel costs on the basis that that these were incurred by the service provider regardless of the type of treatment and estimated operating theatre and outpatient costs to be £624 and £15, respectively. No complications were reported at six-month follow-up. It concluded that interventions for trigger digits undertaken in the outpatient setting by trained surgeons result in significant cost savings compared to those undertaken in a standard operating theatre, without compromising quality of care.

The cost of five different treatment strategies were compared in a US study published in 2009. These were: steroid injection followed by surgical release for failure or recurrence (1); steroid injection followed by second injection for failures or recurrence with definitive surgery if needed (2); three steroid injections before definitive surgery if needed (3); surgical release (4); and percutaneous release with definitive open surgery if needed (5).⁽³⁵⁾ It reported that strategy 2 was the least costly treatment of those considered. The most costly treatment, surgical release (4), cost between 248% and 340% more than the second strategy. It was noted that for surgical or percutaneous release to cost less than the second strategy, the surgical billing charge would need to be lower than \$742 for private payers or less than \$305 of Medicare reimbursement, based on 2005 costs.

A retrospective review in 1997 was carried out on 109 TFs in 102 patients with respect to management plan and response to treatment.⁽³³⁾ It reported that surgical release cost Medicare patients US\$250 more than a second injection, but that this additional cost may be offset by the benefit of permanent relief.⁽³³⁾

2.4 Budget impact and resource implications

The estimated average cost of a TF release in Ireland in 2011 is included in Table 2.2. Of note, the HSE National Casemix Programme does not include a diagnosis related group (DRG) specifically for TF release. Therefore, a more general DRG code

of 'hand procedures' is included to give an estimate of the cost. HIPE discharge data suggests that 95% of TF release procedures in 2011 used these codes; however as the TF release procedures accounted for only approximately 1% and 18%, respectively, of total procedures within the I30z and I30 DRGs, it is not known if these costs are representative.

Table 2.2 Cost of HSE inpatient and day case surgery summarised by diagnosis-related group (based on 2011 costs and activity)

DRG code	Description	Cost/case (€)
I30z	Hand procedures,* inpatient	3,179
I30	Hand procedures,* outpatient	1,743
-	Outpatient appointment	130

Data summary from the HSE National Casemix Programme based on activity and costs reported by 39 participating hospitals.

**Note: there is no specific code for TF release, the nearest code is included and as such provides only an estimate of the cost. However, HIPE discharge data suggests that 95% of procedures in 2011 used the code I30z.*

Costs for conservative treatment may include therapy fees, custom-made splints and corticosteroid injection. Typically a patient is seen once for assessment and splint and possibly again in six to ten weeks if symptoms are not resolving.⁽⁸⁾ It is estimated that a custom-made splint will cost between €5 and €7.⁽⁸⁾ In addition to this, the overall cost of conservative treatment will include the cost of subsequent surgery for patients who fail to respond.

It is predicted that the use of transparent clinical referral criteria has the potential to reduce the number of patients being referred for outpatient review for whom non-surgical management is recommended. This would help optimise the patient journey, ensuring the right patients are referred and treated at the right time, allowing more efficient use of available resources.

2.5 Advice on clinical referral/treatment threshold

The literature indicates that there is a general agreement with the British Society for Surgery of the Hand (trigger finger) guidelines.⁽²⁾ Therefore, the following criteria are advised in line with this:

Surgical release is recommended for:

Adult trigger finger:

- after failed conservative treatment (splinting, exercise for six to ten weeks) and including up to two corticosteroid injections **OR**
- if there are severe symptoms at presentation, i.e. a fixed flexion deformity that cannot be corrected **OR**
- in patients who are unlikely to benefit from corticosteroid injections (for example, patients with diabetes who have multiple digits affected and severe symptoms).

Paediatric trigger thumb:

- if there are severe symptoms at presentation, i.e. a fixed flexion deformity that cannot be corrected **OR**
- if the condition does not resolve spontaneously or with splinting or exercise.

3 Discussion

Referral thresholds have been recommended based on a comprehensive review of the literature with the aim to treat the right patients at the right time and to avoid unnecessary interventions, particularly in those who are likely to improve without surgery. This referral threshold is not new to the Irish system; it is currently being used by many primary care practitioners and surgeons, but not necessarily consistently.⁽⁸⁾

As discussed in Section 1.4, one caveat to the effective implementation of referral thresholds in Ireland is the limited access to conservative treatment in the primary care setting. It is reported that there is extremely limited access to specialised hand therapists. Currently the Irish Association of Hand Therapists has five registered certified hand therapists (four occupational therapists, one physiotherapist) and two accredited hand therapists through the British Association of Hand Therapists.⁽⁸⁾ In addition there are a number of occupational therapists and physiotherapists working in regional hospitals with experience in treating hand injuries.⁽⁸⁾ Waiting lists for general occupational and physiotherapy services may exceed six weeks. Corticosteroid injection treatment is only provided by a limited number of GPs who

have specialist training. Therefore, patients may continue to be referred to hospital-based specialists to provide conservative treatment in the absence of community-based services. Of note, initiatives are underway by the Orthopaedic and Rheumatology Clinical Programmes in the HSE to develop interface clinics and consultations between primary and secondary care services in Ireland and to implement agreed national referral guidelines for all patients with musculoskeletal disease.

Again, although beyond the specific remit of this assessment, feedback was provided around anomalies in the service location in which certain treatments are provided. While it was noted that injection corticosteroid therapy for trigger finger may be safely provided in the outpatient setting by trained providers, current reimbursement policies and high outpatient clinic numbers influence local practice, so that in some hospitals patients must be rebooked as day cases following outpatient surgical review. This necessitates a repeat hospital visit with associated increased costs and delays for patient and provider. Initiatives described in the Department of Health's 'Money follows the patient – policy paper on hospital financing,' where funding will be based on the episode of care and not by reference to the care setting, may reduce inefficiencies due to funding anomalies.⁽⁴⁷⁾

Demand for TF release surgery has increased moderately since 2005. This trend is expected to continue given the increased prevalence of TF in patients with diabetes and the well documented rising prevalence of diabetes in Ireland. Given the uncertainty in relation to the proportion of patients with TF who would be candidates for conservative treatment it is difficult to estimate what impact, if any, the introduction of formal thresholds would have on outpatient referrals and surgical activity. However, the use of stated thresholds that are integrated into agreed national referral guidelines should bring greater transparency, ensure equity of access based on clinical need and allow maximal benefit to be gained from existing resources. Implementation of thresholds will depend on timely access to the full range of conservative treatment options at the primary care level and, as outlined in the ethical analysis report, if clinical referral or treatment thresholds are implemented, it is imperative that there are opportunities for appeal mechanisms to ensure good governance. Continued trends towards providing certain surgical procedures as a day case or within a minor procedure setting has the potential to reduce the cost of surgical management without reducing quality of care.

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Appendix 1 – Clinical guidelines, systematic reviews and cost-effectiveness studies

Guideline	Scope	Trigger finger thresholds	Evidence
BSSH (2013) ⁽²⁾ UK	Indications: TF (thumb) Population: Adults and paediatric trigger thumb	Recommendations for treatment of trigger digit in adults: Mild: Analgesia Moderate: Steroid injection to flexor sheath Severe or failed non-operative treatment: Surgical trigger release Treatments without evidence: No effect is demonstrated for the following treatments which are Not Recommended: <ul style="list-style-type: none"> ■ NSAIDs, except for simple analgesia ■ Placebo injection (Lambert 1992, Murphy 1995, Baumgarten 2007) ■ Work-place modifications (Trezies 1998). 	Literature review: None. Grading system: None. Key references: Murphy (1995), ⁽¹⁶⁾ Akhtar (2005), ⁽⁷⁾ Fleisch (2007), ⁽⁵⁾ Peters-Veluthamaningal (2008), ⁽¹⁸⁾ Patel (1992). ⁽⁴⁸⁾
ACOEM (2012) ⁽³²⁾ US	Indications: TF Population: Not specified	The ACOEM recommend the following: Education for select patients (insufficient evidence) Splints for select cases (i.e. patients who decline injection) of acute, subacute, or chronic flexor tendon entrapment (insufficient evidence) Glucocorticosteroid injections for acute, subacute, or chronic flexor tendon entrapment (strongly recommended) Open release for persistent or chronic flexor tendon entrapment. Percutaneous release is a reasonable option (moderately recommended).	Literature review: None. Grading system: None. Key references: None.

Reviews and RCTs	Description	Sample size (n)	Finding
Surgery versus non-surgical treatment			
Wang et al (2013) ⁽¹³⁾ China	Systematic search for RCTs, meta-analysis	Seven RCTs, n=676 patients	<i>Percutaneous release, open surgery, or corticosteroid injection, which is the best treatment method for trigger digits?</i> No differences in failure rate (RR = 0.93; 95% CI, 0.14-6.25) and complication frequency (RR = 0.83; 95% CI, 0.15-4.72) between patients undergoing percutaneous release and open surgery. Patients treated with percutaneous release had fewer failures (RR = 0.07; 95% CI, 0.02-0.21) and a greater level of satisfaction (RR = 2.01; 95% CI, 1.62-2.48) compared to patients treated with corticosteroid injections. No difference in complication frequency between percutaneous release and corticosteroid injection (RR = 3.19; 95% CI, 0.51-19.91).
Sato et al (2012) ⁽¹⁷⁾ Brazil	Prospective RCT	Injections: n=49 patients. Percutaneous release: n=45. Open: n=56.	<i>Treatment of trigger finger: randomized clinical trial comparing the methods of corticosteroid injection, percutaneous release and open surgery:</i> A minimum follow-up time of six months. The trigger cure rate for patients in the injection method group was 57%, and wherever necessary, two injections were administered, which increased the cure rate to 86%. For the percutaneous and open release methods, remission of the trigger was achieved in all cases. The percutaneous and open surgery methods displayed similar effectiveness and proved superior to the conservative CS method regarding the trigger cure and relapse rates.
Zyluk et al (2011) ⁽⁴⁰⁾ Poland	Prospective RCT	Injections: n=59 digits. Surgery: n=46.	<i>Percutaneous A1 pulley release vs steroid injection for trigger digit: the results of a prospective, randomised trial:</i> Results were assessed at one and six months, measurements included rate of recurrence (primary outcome measure), pain on movement, active range of movement of the affected digit and grip strength. No recurrences seen at one month. At the one month assessment, patients after steroid injection achieved greater active range of movement of the fingers (270° vs 264°) and stronger grip (99% vs 85%) than those treated by percutaneous release. At six months six recurrences (11%) occurred in steroid injection group and none in the percutaneous release group (P = 0.005). Patients after percutaneous release had less pain on movement of the involved digit (VAS 0.4 vs 1.3), but still had lower AROM of the fingers (265° vs 270° after steroid injection). Concluded that percutaneous A1 pulley release is more effective medium-term therapy for trigger digit than steroid injection, because of lower risk of recurrence.

Nimigan AS et al (2006) ⁽³⁴⁾ Canada	Retrospective review	N=118 digits (92 non-diabetic)	<p><i>Steroid injections in the management of TFs:</i> 89 digits received >1 steroid injection: 46 (52%) resolved completely and 42 (47%) were improved. Non-diabetic digits treated successfully in 40/70 digits (57%) with steroid injection therapy. Diabetic patients had success rate of six of nineteen (32%) with steroid injections, significantly lower than non-diabetics (P=0.04). All type 1 diabetics (n=5) required surgical treatment.</p> <p>Surgical treatment successful in 71 of 72 (99%) digits. No side effects of steroid injection were noted, and short-term post-operative side effects noted in 26 of 72 surgical patients (36%). No statistically significant differences were found in surgical complication rates in diabetics vs. non-diabetics or type 1 diabetics vs. type 2 diabetics.</p> <p>Steroid injection therapy should be first-line treatment of TFs in non-diabetic patients. In diabetics, the success rate of steroid injection is significantly lower. Injection therapy for type 1 diabetics was ineffective in this study. Surgical release of the first annular (A1) pulley is most effective overall in diabetics and non-diabetics alike, with no higher rates of surgical complications in diabetics.</p>
Benson et al (1997) ⁽³³⁾ US	Retrospective review	N=109 TF, 102 patients	<p><i>Injection versus surgery in the treatment of trigger finger:</i> Thirty-four digits underwent surgery, 75 digits treated with local steroid injection only. Data suggest that surgical management may be next best option in patients with TF who continue to be symptomatic after a single injection.</p>
Non-surgical treatments			
Peters-Veluthamaningal et al (2009) ⁽¹⁵⁾ Netherlands	Cochrane review	Two RCTs rated 'poor quality', n=64 participants	<p><i>Corticosteroid injection for trigger finger in adults:</i> Thirty-four allocated to corticosteroids and lidocaine, 29 allocated to lidocaine alone. Corticosteroid injection with lidocaine more effective than lidocaine alone for treatment success at four weeks (relative risk 3.15, 95% CI 1.34 to 7.40). No adverse events or side effects were reported.</p>

Economic Analyses	Type	Approach/Findings
Kerrigan and Stanwix (2009) ⁽³⁵⁾ US	Decision model (payers perspective)	<p><i>Using evidence to minimize the cost of trigger finger care:</i> Five strategies of treatment: (1) steroid injection followed by surgical release for failure or recurrence, (2) steroid injection followed by second injection for failures or recurrence, followed by definitive surgery if needed, (3) three steroid injections before definitive surgery if needed, (4) surgical release, and (5) percutaneous release with definitive open surgery if needed.</p> <p>Strategy 2 is the least costly treatment of those considered in this study. The most costly treatment, surgical release, costs between 248% and 340% more than the second strategy. For surgical or percutaneous release to cost less than the second strategy, the surgical billing charge would need to be lower than \$742 for private payers or less than \$305 of Medicare reimbursement.</p>

Webb and Stothard (2009) ⁽⁴⁶⁾ UK	Cost minimisation	<p><i>Cost minimisation using clinic-based treatment for common hand conditions – a prospective economic analysis:</i></p> <p>Patients with a diagnosis of Dupuytren's disease, trigger digit or ganglion of the wrist or hand requiring treatment prospectively identified over a six-month period.</p> <p>Over six months 80, 26, and 52 patients were treated for Dupuytren's disease, ganglia and trigger digits, respectively. Of these, 37, 23, and 44 were treated by an outpatient procedure, and 43, three and eight underwent a formal operation. The total cost of the outpatient procedures was calculated at £1,560 over six months. To perform these as formal operations would have cost £64,896. The cost savings were, therefore, £63,336, or £126,672 per annum.</p> <p>Outpatient interventions for Dupuytren's disease, ganglia and trigger digits result in significant cost savings over formal surgical treatment.</p>
Benson et al (1997) ⁽³³⁾ US	Cost analysis	<p><i>Injection versus surgery in the treatment of trigger finger:</i></p> <p>Accrued patient charges were calculated for initial office visit, office injection of a tendon sheath, anteroposterior (AP) and lateral radiographs of the hand, follow-up office visit, surgical release of the A1 pulley, operating room time and equipment charges, and post-operative office care. Additional expense related to the treatment of any post-operative complications was also tabulated.</p> <p>Surgical release of the A1 pulley cost the Medicare patients \$250 more than a second injection; it was predicted that this additional cost may be offset by the benefit conferred through permanency of relief.</p>

*Note: As part of the changes to the NHS brought about by the Health and Social Care Act 2012, Primary Care Trusts (PCTs) and Strategic Health Authorities (SHAs) ceased to exist on 31 March 2013. Their responsibilities were taken over by Clinical Commissioning Groups (CCG) and the NHS Trust Development Authority. However, thresholds previously developed by these trusts are likely to represent ongoing practice at a local level as evidenced by their continued use by some CCG.

Appendix 2 – Examples of UK NHS PCT thresholds*

UK PCT* examples of thresholds	Scope	Threshold	Evidence
North West London Commissioning Support Unit (2013) ⁽⁴⁹⁾ (adopted by eight NW London CCG)	Indications: TF Population: Not specified	Surgery for trigger finger will be funded in patients who have functional limitation affecting lifestyle or occupation and meet one of the following criteria: Failure to respond to conservative treatment, including at least two corticosteroid injections with dates. Who have a fixed flexion deformity that cannot be corrected. Patients for whom corticosteroid treatment is not suitable, such as multiple digits affected.	BSSH Akthar (2007) Peter-Veluthamaningal (2008) Baumgarten (2008) Ring (2008)
NHS Coventry and Warwickshire PCT(2011) ⁽⁵⁰⁾	Indications: TF Population: Adults	Management should be in accordance with British Society for Surgery of the Hand (BSSH) recommendations: <i>Classification:</i> <i>Mild ('pre-triggering')</i> <ul style="list-style-type: none"> ■ History of pain or of catching or 'click' ■ Tender A1 pulley; but fully mobile finger <i>Moderate</i> <ul style="list-style-type: none"> ■ Triggering with: <ul style="list-style-type: none"> A – difficulty actively extending finger B – need for passive finger extension Loss of complete active flexion <i>Severe</i> <ul style="list-style-type: none"> ■ Fixed contracture Treatment recommendations: <i>Mild</i> – Analgesia <i>Moderate</i> – Steroid injection to flexor sheath Surgical Threshold : <i>Severe (as defined above) or failed non-operative treatment</i> – Surgical trigger release	BSSH
NHS North Central London PCT (2012)	Indications: TF Population: Not specified	Criteria for eligibility: Patient has failed to respond to a single hydrocortisone injection. OR Patient has fixed deformity that cannot be corrected. Rationale/Evidence <ul style="list-style-type: none"> ■ Spontaneous recovery has been reported in 20% to 29% of cases of TF. 	Moore (2000), ⁽⁵¹⁾ Patel (1992), ⁽⁴⁸⁾ Peters-Veluthamaningal

		<ul style="list-style-type: none"> ■ Initial treatment of TF is conservative. Steroid injections are very efficacious, therefore these should be attempted before surgical intervention. ■ Surgical management is a cost-effective option in patients with TF who continue to be symptomatic after a single injection. ■ A Netherlands trial which was part of a larger study called the Groningen Hand and Wrist Injection Therapy Trial (HAWITT) showed that the injection therapy provided by a primary care provider is an effective and safe alternative to surgical therapy and the initial beneficial effect of steroid injections lasts up to 12 months. ■ Operative therapy is effective (60-97% cure rate), but risks surgical complications. 	(2008) ⁽¹⁸⁾
NHS Herefordshire PCT (2011) ⁽⁵²⁾	<p>Indications: TF</p> <p>Population: Not specified</p>	<p>Policy statement: Unless one or more of the following criteria are met surgical treatment will not normally be funded:</p> <ul style="list-style-type: none"> ■ Failure to respond to conservative measures (e.g. up to two hydrocortisone injections) OR ■ Fixed deformity that cannot be corrected. 	Not included.

* As part of the changes to the NHS brought about by the Health and Social Care Act 2012, Primary Care Trusts (PCTs) and Strategic Health Authorities (SHAs) ceased to exist on 31 March 2011. Their responsibilities were taken over by Clinical Commissioning Groups and the NHS Trust Development Authority.

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