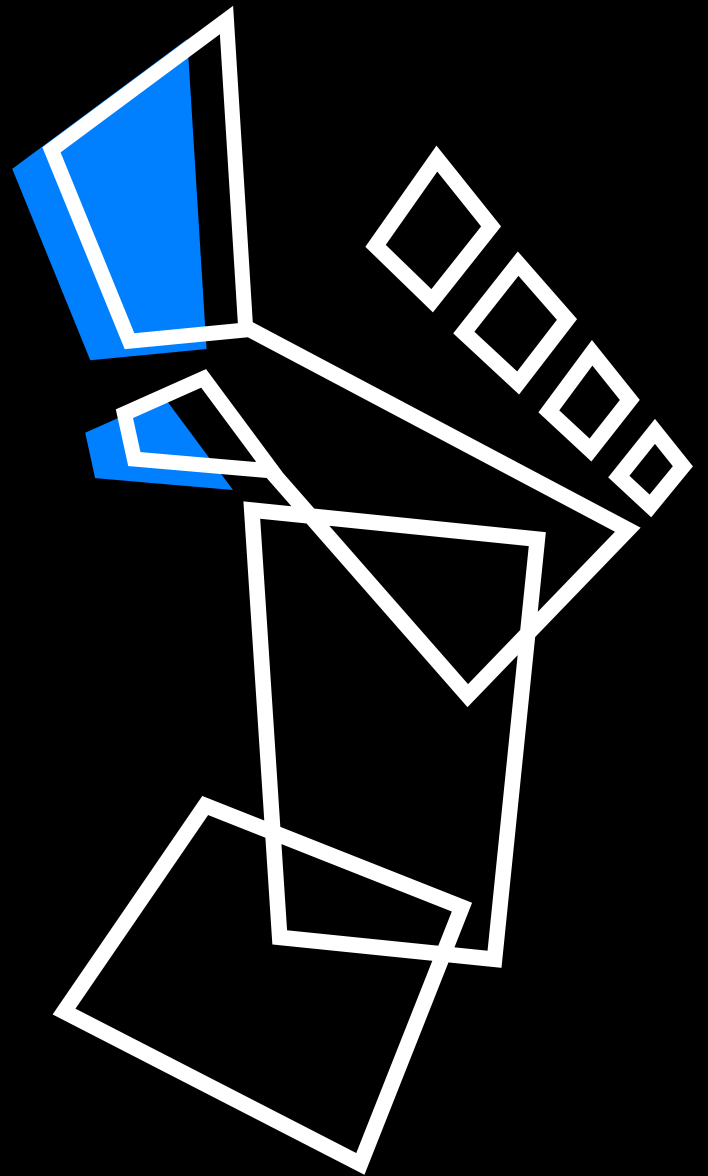


# Bunions: A National Think Tank



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# Introduction

ORUK in association with Rosetrees, is developing a new programme led by professor Jitendra Mangwan called Bunions Think Tank. It aims to address the variation in the treatment of bunions in the UK, which roughly affects 14 million people.

The following document is intended to provide Think Tank attendees with a summary of the disease burden and its impact on individuals, society, and the health system, plus surgical treatment operations. It concludes with knowledge gaps that potentially merit further research and a list of discussion topics for the Think Tank.



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## In association with



Rosetrees is delighted to be partnering with Orthopaedic Research UK in bringing together the best minds in the UK to address the significant problem of bunions in the UK and worldwide.

As a charity supporting cutting edge research, we hope to identify the best innovative ideas to support and together with ORUK, we hope to be a catalyst for change.

We look forward to developing the best ideas from this Think Tank event.

**Ann Berger, Chief Executive**  
Rosetrees

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## Lay Summary

Bunions are a common condition of the foot in which the big toe joint protrudes outwards. This causes a lump to form at the joint and the angle of this lump can be measured using an X-Ray. Women are most likely to have the condition. It is caused by a range of factors including poorly fitting shoes, genetics and joint problems such as osteoarthritis or rheumatoid arthritis and therefore tends to affect older people. The condition causes pain and swelling around the big toe joint and can reduce a person's activity levels and quality of life. It is also linked to increased falls in older people. The burden of the disease is not only to the individual but also their families, the health service and society as a whole.

There are two ways to treat bunions: non-operatively or operatively, and as such patients with bunion may be managed by a number of healthcare professionals (e.g. podiatrists, physiotherapists, surgeons) in both community and hospital settings. Non-operative treatments include pain relief gels and tablets, shoe adaptations and splints. Operative techniques range from shaving the bone to breaking and resetting the bone. Surgery may involve open surgery (where a cut is made in the skin) or minimally invasive techniques

(keyhole surgery). Minimally invasive surgery may reduce post-operative pain however we do not currently know if the outcome of this type of surgery is better than open surgery.

Bunion operations are increasing year-on-year and recurrence of bunions in the five years and longer after surgery remains a problem. There is a lot of variability in the UK as to how bunions are managed and no clear consensus on which treatment technique is the best. Furthermore, the outcomes we use to measure the impact of bunion treatment vary greatly and may not consider the most important issues for patients e.g. time to return to activities (including sports and work), return to driving and return to normal footwear. X-Rays are performed before and after treatment to measure the big toe joint angle, however there is no standardisation on when this should be done.

In summary, there is currently large variability in terms of bunion management in the UK with further research needed to address the gaps in our knowledge. This will enable patients and clinicians in the future to make informed choices about the best treatment approach for bunions.

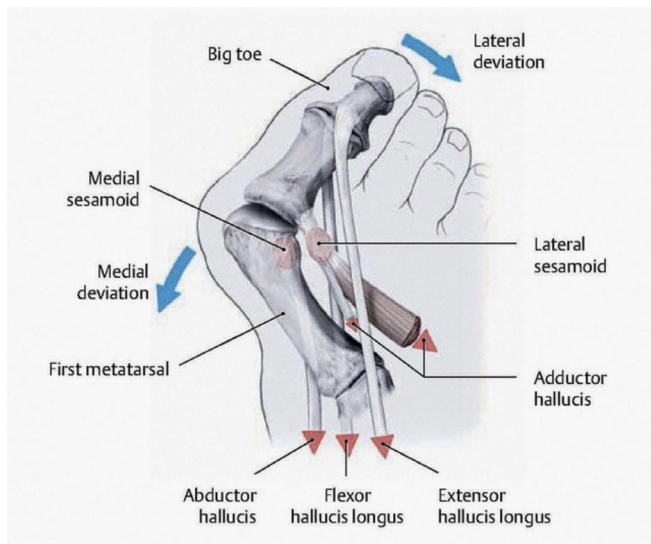
## Scientific Summary



Figure 1: Photograph and radiograph demonstrating Hallux Valgus deformity with medialisation of the first metatarsal, increased intermetatarsal angle and valgus deformity of the first metatarsophalangeal joint. Image courtesy of Robbie Ray.

Hallux valgus, otherwise known as bunion, is a common foot issue. It represents a complex deformity where the big toe is no longer straight. The top of the big toe is deviated outwards towards the other toes, while the bottom of the big toe points inward, causing a bump to form at the joint (known as the metatarsophalangeal joint). Research has shown that up to 23% of adults under the age of 65 have a bunion and the risk increases to 35% over the age of 65. In addition, women are 15 times more likely to develop a bunion<sup>1</sup>.

The cause of hallux valgus is multifactorial due to the complex interplay between several predisposing intrinsic and extrinsic factors. This includes footwear, biomechanical forefoot overload, soft tissue hypermobility/laxity, genetics and metatarsal morphology including rotation or hindfoot alignment<sup>2</sup>.



**Figure 2: Deforming forces affecting the first metatarsal leading to development and progression of Hallux Valgus deformity.** Source: DWC Wong, *Biomechanics of Hallux Valgus and Evaluation of Interventions*, Thesis Oct 2013, DOI: [10.13140/RG.2.2.36341.60643](https://doi.org/10.13140/RG.2.2.36341.60643)<sup>3</sup>

While some people have no issues with their bunion, many people develop symptoms such as pain along the bunion caused by rubbing of the shoe or on walking. Bunions can be treated without an operation such as with shoe modifications, splints or pain relief but these only treat the symptoms and do not address the bunion itself<sup>4</sup>. Alternatively, people who have ongoing pain or issues despite initial treatment can have surgery. There are many different options for surgery which range from shaving off the bunion (bunionectomy) to improving the alignment of the toe to make it straighter by breaking and resetting the bone (osteotomy)<sup>5</sup>.



**Figure 4: Photographs of a simulated bone demonstrating a distal chevron osteotomy procedure for correction of Hallux Valgus deformity.** Image courtesy of Tom Lewis.

Traditionally, these surgeries are done using an open approach; this means that a cut is made along the toe so that the bone can be seen and carefully cut with a small saw and realigned to improve the overall shape of the toe and improve symptoms. Recently however, a new minimally invasive technique has been developed where smaller instruments are used through small cuts in the skin. This has the benefit of disrupting fewer of the soft tissues in the foot such as the skin, muscle or joint capsule. Initial research has shown that people who under minimally invasive surgery (MIS) tend to have better postoperative pain however it is unknown if there is any meaningful difference between open surgery and MIS<sup>6</sup>.

## Treatment Pathway

Patients with hallux valgus are treated by a large number of healthcare professionals across both primary and secondary care. Patients with hallux valgus may seek advice from general practitioners and community physiotherapists. There is variability in local referral pathways and funding from clinical commissioning groups across the United Kingdom. Referral to secondary care (either in the public or independent sector) typically involves foot and ankle specialist orthopaedic surgeons however in some cases, surgical podiatrists may be involved in delivery of surgical treatment.

## Disease burden

Approximately 23% of adults aged between 18 to 65 suffer with bunions with numbers rising to 36% in people over 65<sup>7</sup>. In addition, women are over twice as likely to develop hallux valgus compared to men (30% women, 13% men)<sup>7</sup>. Multiple studies have shown that people with hallux valgus have worse scores on health-related quality of life (HRQOL)<sup>8</sup>. In addition, bunions can affect balance and gait<sup>9</sup>. In the elderly, this is particularly relevant as it leads to an increased risk of falls and sustaining other fall-related injuries. Furthermore, research has shown that there is a greater reduction in physical function, bodily pain, general health, social function and mental health as severity of hallux valgus increases.

## Impact on the NHS

A recent study based on Hospital Episodes Statistics (HES) in England over a 10-year period of 1999 to 2019 showed that an average of 10,157 surgeries were undertaken for bunion surgery every year<sup>10</sup>. Patients between the ages of 60 to 64 years were the largest group to have the procedure. The data also showed that women were eight times more likely to have the procedure. The graph below clearly shows an upward trend in procedure numbers since 2000 with numbers plateauing between 14,000 to 16,000 per year between 2011 to 2019.

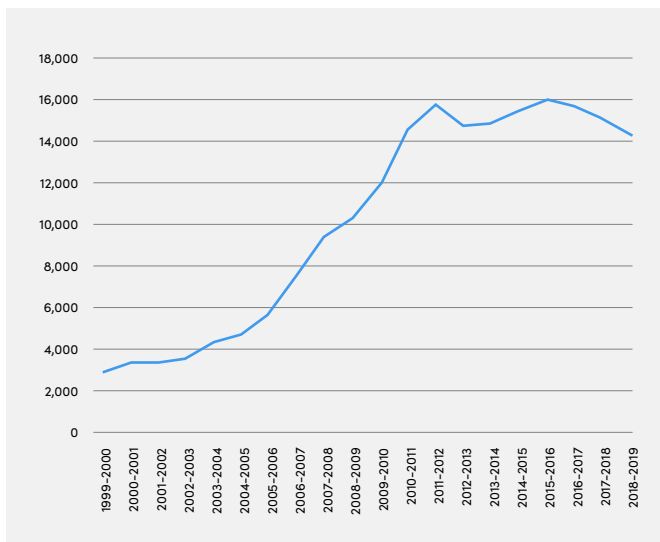


Figure 4: NHS Hospital Admitted Patient Care Activity Episode Statistics from NHS Digital demonstrating number of day case Hallux Valgus procedures per year performed in England from 1999 to 2019

## BOFAS registry

Data from the British Orthopaedic Foot and Ankle Society (BOFAS) registry has suggested that hallux valgus is becoming an increasing burden on foot and ankle services.<sup>11,12</sup> Diagnosis of adult hallux valgus increased by 63% from 2022 to 2023. Within that, it was also shown that the most frequent surgical treatment was an open metatarsal osteotomy with or without an Akin. However, MIS osteotomy was shown to be better performing at the 1-year mark. Furthermore, bunion correction has been shown to improve quality of life and symptoms with statistically significant improvements Manchester-Oxford Foot Questionnaire (MOXFQ), EQ5-D and VAS pain. This has been further supported by other research that has shown any surgical intervention is likely to improve a patient's quality of life, regardless of the degree of correction<sup>13</sup>.

## Societal impact

With such high prevalence and volume of surgeries being done under the NHS, it is clear that bunions have a significant impact on society. Hallux valgus is associated with foot pain, poor balance, gait impairment and an increased risk of falls and so represents a significant health problem. As the prevalence increases with age, the risk of falling is particularly problematic as it can lead to fragility fractures<sup>14</sup>. Furthermore, it affects women much more than men and has been shown to be more strongly associated with pain and arthritis in women when compared to men in the context of increasing age<sup>14</sup>.

Footwear is also a current issue. Incorrectly fitted footwear is known to contribute to foot pain and disorders as well as negatively impact quality of life<sup>15</sup>. This is particularly relevant to women as the majority of women's shoes have been shown to have a narrower toe box<sup>16</sup>. In the context of hallux valgus, this is highly problematic as it can exacerbate symptoms in women who are already more likely to have symptomatic bunions and there is a lack of alternative footwear available.

# Evidence for interventions

## Treatment options

Treatment options for hallux valgus vary depending on the symptoms and severity of the condition. Hallux valgus can be treated conservatively or operatively. For patients with minimal to moderate symptoms and deformity, conservative management in the form of lifestyle advice, orthoses or exercises may be sufficient. However, those with worsening deformity or symptoms refractory to conservative management, surgery may be indicated. Surgical management can vary significantly from soft tissue releases to open osteotomies.

Non-surgical treatments including footwear modification, analgesia and custom orthotics or shoe inserts have some effectiveness at improving symptoms or deformity. However, one systematic review found at least one trial which showed that surgery, specifically distal chevron osteotomy of the first metatarsal, is a more effective procedure for pain compared to conservative treatment<sup>17</sup>. Surgical intervention may be considered if conservative measures do not provide sufficient relief or if the bunion is causing significant pain and impairment in daily activities.

Surgical procedures for hallux valgus aim to realign the big toe joint and remove the bony prominence to improve foot function and alleviate pain. This typically involves cutting the first metatarsal bone to allow reshaping and realignment (an osteotomy). There are over 130 different surgical techniques described for the operative management of hallux valgus. This includes a range of open, percutaneous and other minimally invasive osteotomies or fusion techniques, combined with various fixation methods.

## Outcome measures

There are a range of outcome measures used to assess the outcomes of bunion surgery<sup>18,19</sup>. This includes radiographic measurements (such as hallux valgus angle, intermetatarsal angle), clinical outcomes (such as recurrence rate, complications) and patient reported outcome measures which can either be general health-related quality of life or foot and ankle specific. (such as MOXFQ, VAS-Pain, EQ-5D). Some of these are validated for use in hallux valgus surgery. A review of the evidence suggests that there is a wide variety of outcome measures used with no consensus as to which should be. The BOFAS clinical outcomes committee and BOFAS registry utilise the MOXFQ, VAS-Pain, EQ-5D which are all validated outcome measures. The published literature does not have evidence for which outcome measures are important to patients and it is worth considering investigating this in more detail. Considerations to clarify include time to return to activities (including sports), return to driving, return to normal footwear, return to work,

Radiographic deformity correction is usually assessed pre- and post-operatively with common measurements including the hallux valgus angle and the intermetatarsal angle. There is no standardised timing for when radiographic assessment should be performed although this is frequently at 6 weeks following surgery. Severity of hallux valgus is typically classified on either photographs or radiographic assessment of weight-bearing radiographs.

Conservative Management	Surgical Management
Lifestyle, orthotics, shoe wear modification	Soft Tissue Release e.g. <ul style="list-style-type: none"> <li>Adductor hallucis and lateral joint capsule release</li> <li>Bunionectomy and capsular plication</li> </ul>
Pain relief	Open osteotomy e.g. <ul style="list-style-type: none"> <li>Scarf</li> <li>Chevron</li> <li>Akin</li> </ul>
Night splints or orthotics	Minimally invasive surgery
Exercises and stretches	Fusion surgery e.g. Lapidus
Steroid injections	

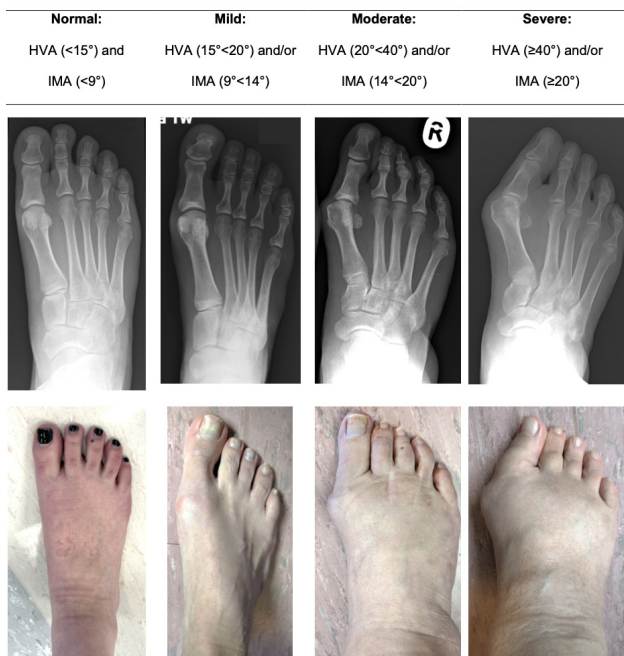


Figure 5: Severity of Hallux Valgus deformity classified by radiographic assessment. Images courtesy of Robbie Ray.

## Open Surgery

The traditional technique used in the UK for management of hallux valgus is an open osteotomy. Typically performed through a medial approach, there are many different open osteotomy techniques including scarf/ Akin, chevron, proximal rotational and arthrodesis procedures. Despite the ubiquity of open hallux valgus correction across the UK, there are remarkably few methodologically robust or comparative studies comparing different osteotomy techniques. There are a number of studies reporting the outcomes of Scarf osteotomies with excellent short term patient satisfaction and low reported complications rates with one meta-analysis of 25 studies comprising 1,583 Scarf osteotomies with mean follow-up of 26.4 months finding a low rate of reported complications with 2.4% infection rate, 1.8% non-union rate, 2.7% malunion rate, 3.4% rate of iatrogenic hallux varus with only 5.1% recurrence rate<sup>20</sup>. However despite a number of short-term studies reporting positive outcomes, there are very few studies with follow up greater than 5 years follow up. Long-term data suggests that under correction is common and subsequent recurrence of deformity is more common than perceived. Jeuken et al. reported that the recurrence

rate was 75% after 14 years of follow-up<sup>21</sup>. Another systematic review including studies with a minimum follow-up of 5 years found that in the 17 identified studies the recurrence rate was 65% suggesting the under-reporting of this in the current literature due to the paucity of long-term follow-up studies<sup>22</sup>.

## Minimally Invasive Surgery

Recently there has been increasing interest in minimally invasive or percutaneous surgery. This has been driven by advances in surgical/implant technology, understanding of hallux valgus deformity and recent literature. There are a growing number of large independent case series reporting the outcomes of third and fourth-generation MIS HV deformity correction demonstrating significant improvements in clinical and radiographic outcomes at 2 years following surgery<sup>23-29</sup>. The current UK NICE guidance on use of percutaneous HV surgery was published in 2010<sup>30</sup>. This guidance described the evidence for this procedure as limited and inconsistent however the evidence cited utilise first and second-generation techniques. This NICE guidance predates the publication of the first scientific article on third-generation percutaneous surgery which was published in 2013, thus contains no studies of contemporary procedures undertaken with stable screw fixation. The NICE guidance has been updated and due for publication imminently, although the number of high-quality comparative studies comparing surgical procedures remains limited.

## Pronation and Sesamoid reduction

In a similar fashion to the increasing interest in minimally invasive surgery, the advent of weight-bearing CT has facilitated investigation into the relationship between hallux valgus and sesamoid position/metatarsal pronation. There are a few studies investigating rotational deformity and correction that can be achieved during hallux valgus surgery although there remains very few report the short or long-term outcomes in patients with residual pronation or sesamoid uncoverage with either open or minimally invasive techniques. There are theories that residual pronation or incomplete sesamoid reduction may predispose to recurrence of HV<sup>31-35</sup>.

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## Recurrence

Recurrence of HV can lead to pain, difficulty with footwear and is technically challenging to treat<sup>13,36,37</sup>. It is frequently difficult to compare the recurrence rates of different studies and surgical techniques for HV deformity surgery because of the wide variation in the literature regarding the definition and threshold of recurrence of HV (HVA ranges from >15 to >20 degrees), particularly regarding incomplete deformity correction, as well as the time frame at which measurement of radiographic deformity to assess for recurrence should be performed. A recent systematic review of 17 studies comprising 18 data sets, reported the outcomes of 4 distal metatarsal osteotomy techniques with minimum follow-up of 5 years: Chevron, Mitchell, Bösch, and "others"<sup>38</sup>. The HV recurrence rate was 64% considering the threshold of >15 degrees HVA, 10% having >20 degrees, and 5% having >25 degrees.

## Systematic Reviews

It is important to consider the lack of comparative or randomised evidence for the management of hallux valgus in the context of systematic reviews investigating hallux valgus. Systematic reviews comparing open versus minimally invasive surgery techniques found no difference in radiographic deformity correction, patient reported outcomes or complication rates<sup>39,40</sup>. Systematic reviews suggest that clinical outcomes and radiological deformity correction following third-generation percutaneous techniques are non-inferior to traditional open techniques, and may have reduced pain scores, smaller scars, reduced analgesia usage and potentially quicker recovery<sup>41</sup>.



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# Gaps In Research And Discussion Points for the Think Tank

The most important future research is the urgent need for high-quality, methodologically robust studies that will help build the evidence base for hallux valgus surgery.

From careful review of the literature there are specific questions to address include:

## Primary Care/Secondary Care Interface

- What criteria should be used to justify referral to secondary care?
- What is the variability of referral pathways across the United Kingdom?
- What is the current distribution of surgical practice across the United Kingdom?
- What information is important and relevant to patients in terms of patient education about hallux valgus?

## Outcome Assessment

- What outcomes should we use to assess patients with hallux valgus e.g. Patient Reported Outcome Measures (PROMs)/radiographic deformity?
- What are the key outcomes that matter to patients with hallux valgus deformity?
- What is the definition of recurrence (particularly considering incomplete deformity correction)?
- When should we collect outcome data?

## Non-Operative Management

- What is the role of physiotherapy and other non-operative interventions for hallux valgus? Is it cost effective?
- What are the most effective non-operative interventions?
- What is the rate of progression of hallux valgus deformity in patients managed conservatively?

## Surgical Management

- Which operation for hallux valgus has the lowest risk of recurrence?
- Is there a meaningful difference in clinical and patient-reported outcomes function between open and percutaneous surgery?
- What is the role of correction of the metatarsal rotation in the treatment of hallux valgus deformity?
- What is the optimal management of severe hallux valgus?
- Does bilateral hallux valgus surgery at the same time carry a higher risk of complications?
- When should we perform a Lapidus (first TMTJ arthrodesis) procedure?

## Post-Surgery Care

- Do patients undergoing hallux valgus surgery need VTE (venous thromboembolism) prophylaxis–blood clot prevention?
- What should a typical follow up regime look like for hallux valgus?
- What is a standard post-operative regime for return to work/activities following hallux valgus surgery?

## Economic Considerations

- Is there an economic difference between different surgical options?
- When is the most cost effective time to refer to secondary care?
- How can we standardise pathways for hallux valgus in the NHS?

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# Conclusion

Hallux valgus is an extremely common forefoot deformity that impacts upon a large proportion of the population. There is currently large variability in operative techniques with further research needed to address gaps in the literature.

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