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William Heberden: The Man and the Node: A Brief Historical Note

Erin Wolfe[1], Maveric Abella[2,3], Stuart Kuschner[2,3*]

[1]Division of Plastic and Reconstructive Surgery, University of Southern California, Los Angeles, USA
[2]Department of Orthopaedic Surgery, Cedars-Sinai Medical Center, Los Angeles, USA
[3]Center for Plastic and Reconstructive Surgery, Cedars-Sinai Medical Center, Los Angeles, USA
Email: *Shkuschner@yahoo.com

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Abstract

Orthopedic surgeons, plastic surgeons, rheumatologists and primary care physicians frequently see patients who present with enlargement overlying the dorsal aspect of the distal interphalangeal joint of one or more fingers. These patients may be given a diagnosis of Heberden's Nodes, which are hard or bony enlargements overlying the dorsal aspect of the distal interphalangeal joint of one or more fingers, and are considered a sign of osteoarthritis. This article serves as a brief biography of Sir William Heberden and a narrative review of Heberden's Nodes.

Keywords

Heberden's Node, Osteoarthritis, Arthritis, Distal Interphalangeal Joint

1. Introduction

Orthopedic surgeons, plastic surgeons, rheumatologists and primary care physicians not uncommonly see patients who present for evaluation of enlargement overlying the dorsal aspect of the distal interphalangeal joint of one or more fingers. Patients may or may not report pain at the distal interphalangeal joint. They may wonder if there is any significance that merits concern, or they may simply express displeasure at the appearance. They may be given a diagnosis of "Heberden's Nodes". Heberden's nodes are hard or bony enlargements overlying the dorsal aspect of the distal interphalangeal joint of one or more fingers, and are considered to be moderate-to-strong markers of osteoarthritis. They are typically about the size of a pea, and are traditionally thought to be caused by formation of osteophytes at the distal interphalangeal joint. Recent studies also suggest a significant

role of ligaments in the development of Heberden's nodes, as ligaments influence the expression of joint damage including Heberden's nodes and joint erosion formation [1]. Radiographic findings of Heberden's nodes include osteophytes and joint space narrowing at the distal interphalangeal joint. Heberden's nodes are distinct from Bouchard's nodes, which are bony enlargements that develop at the proximal interphalangeal joints of the fingers. Here, for the interested reader, we offer a brief biography of the man and a review of the eponymous node. The purpose of this article is to serve as a historical note and narrative review.

2. Biography

William Heberden was born in England in 1710 and died approaching his 91st birthday in 1801. His father, an innkeeper, died when Heberden was seven [2]. His father's death resulted in diminished family fortunes [3] but Heberden was able to receive free education, heavily weighted on the classics at a parish grammar school [2]-[5]. He continued his studies at Cambridge, enrolling at the age of 14 [5] [6]. He received his MD in 1739 [2]-[4] [6] and thereafter entered private practice, first at Cambridge and later in London "where for many years he conducted a large and fashionable practice" [6]. He became a fellow of the Royal College of Physicians in 1746 [4] [5] and was elected a fellow of the Royal Society in 1749, in recognition of his professional accomplishments and the high regard afforded by his colleagues [2] [3].

William Heberden's contributions to medicine are numerous. He provided an early description of angina pectoris [4]. He made observations on chicken pox, distinguishing it from smallpox [4] [5] and collaborated with Benjamin Franklin on a pamphlet on inoculation for smallpox [4] [5]. He was described as having brilliant intellect and an outstanding ability for clinical observation [5]. Heberden admonished that a physician "must always be guided by his own direct observations and his accumulating experience" [2]. Sage advice then and now. He has been described as "both the father clinical observation of the eighteenth century and also the founder of rheumatology" [4] [7].

Heberden was in the habit of making notes, documenting his findings with regard to the care and treatment of his patients, written in Latin (!) [2] which later in life formed the basis of his book "Commentaries on the History and Cure of Diseases" [8]. Several editions were published posthumously, translated from Latin into English by his son [4]. The 3rd edition published in 1806 is available in its entirety online [8]; 483 pages with 102 chapters. Topics are arranged alphabetically from abdomen to uterus. There is a chapter on rheumatism which Heberden described as "a common name for many aches and pains". Then, as now, patients can present with myalgias and arthralgias for which we may provide a description or a name without a comprehensive diagnosis.

An anecdote which readers of the Journal might find interesting, one which highlights the perils of the pre-antibiotic era: one biographer noted that a grandson of William Heberden, a medical student, died in 1828 as a result of an "infec-

tion of a cut hand at *post-mortem*" [6].

3. Historical Description of Heberden's Nodes

In the 3rd edition of his magisterial "Commentaries on the History and Cure of Disease" Heberden provided a brief description of the nodes which now bear his name, in a chapter entitled *Digitorum*.

Nodi:

> What are those little hard knobs, about the size of a small pea, which are frequently seen upon the fingers, particularly a little below the top, near the joint? They have no connexion with the gout, being found in persons who never had it; they continue for life; and being hardly ever attended with pain, or disposed to become sores, are rather unsightly, than inconvenient, though they must be some little hindrance to the free use of the fingers [8].

Heberden wrote before the discovery of x-rays and so he could make no comment about an association, if any with an underlying osteoarthritis process. He did state that there was no relationship ("connextion") with gout and here history has borne him out. Heberden stated that the nodes are "hardly ever attended with pain" and are "rather unsightly, than inconvenient" implying that they are more of a cosmetic issue.

4. Modern Evidence

Are Heberden's nodes and osteoarthritis at the distal interphalangeal joint synonymous? Writing in 1955, Stecher R.M. stated that Heberden "did not say what they [the nodes] were, so I have more of less deliberately perverted the term [Heberden's *digitorum nodi*] to mean degenerative joint diseases or osteoarthritis of the finger joints" [9]. In an earlier report about Heberden's nodes, Stecher stated that "it is the consensus that they are due to hypertrophic arthritis" [10]. How this consensus arose is not clear nor is it clear whether a true consensus exists. P Kaushik and R Kaushik stated that "Heberden's nodes are bony, hard nodules or swellings that develop around the distal interphalangeal joints" [11]. Hard bony nodules "or" swelling implies that not all enlargement at the distal interphalangeal joint is bony. Cicuttini *et al.* [12] noted that Heberden's nodes are often used as a marker for osteoarthritis. However, in their own study, they found poor agreement between a Heberden's node and a radiological distal interphalangeal osteophyte in the same finger of the same hand and concluded that Heberden's nodes are not synonymous with distal interphalangeal joint osteophyte.

Our own experience is that patients can present with soft tissue enlargement over the dorsal aspect of the DIP joint without radiographic evidence of osteoarthritis. Nonetheless, as noted by Tekeoglu *et al.* [13] while digital nodes remain largely unexplained, there is a consensus that Heberden's nodes are a strong marker for interphalangeal joint osteoarthritis, and most investigators have concluded that they are caused by osteophytes. In language, medical and non-medi-

cal, meaning can change with usage. "Heberden's nodes" and "arthritis" at the DIP joint appear irrevocably linked.

5. Genetics and Comorbidities

It should be noted that there is evidence for a genetic basis for osteoarthritis at the DIP joint [14]. Further, there is evidence that the inheritance of osteoarthritis associated with Heberden's nodes is dominant in females and recessive in males [15]. This would explain the clinical observation of female preponderance. Several authors have shown as association between Heberden's nodes and osteoarthritis of the hip [16] [17]. However, this is not universally agreed upon [18]. In addition, it has been shown that Heberden's nodes do not affect finger dexterity in the elderly population [19].

6. Management

As noted by C. Alexander, Heberden's nodes may grow rapidly or slowly and are not always painful [20]. When there is pain, pain from the underlying arthritis, treatment can include conservative management including topical or oral non-steroid and anti-inflammatory medication, splinting, and hand therapy, as well as more invasive treatment options such as cortisone injection or surgery [21]. Surgical intervention entails DIP joint arthrodesis, often performed with a headless screw. Successful arthrodesis generally relieves pain and patients generally do not find the loss of motion at the DIP to be a significant deficit. Also, most find the post-operative appearance an improvement compared to the pre-operative appearance. A study by Reginster *et al.* from 2022 discusses management of hand osteoarthritis and discusses the range of treatment modalities including US evidence-based medicine guidelines to a European patient-centric approach [21]. These guidelines discuss the aforementioned conservative and surgical treatment methods, and also discusses novel therapeutic approaches that are being evaluated for the treatment of hand osteoarthritis, including various pharmacological interventions as well as non-pharmocological interventions such as nerve stimulation.

7. Conclusion

The English writer Samuel Johnson, also a patient of Heberden, called Heberden the last of the great physicians [6]. According to Guthrie, Heberden "might be regarded more correctly as the first of the modern physicians, so fresh and unbiased was his outlook" [6]. He has been called the "father of clinical observation" [7] and is remembered as the "compleat physician" [22]. Born more than 300 years ago, he lives on in the node that bears his name.

Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this

paper. None of the authors or any member of his or her immediate family has funding or commercial associations (e.g., consultancies, stock ownership, equity interest, patent/licensing arrangements, etc.) that might pose a conflict of interest in connection with the submitted article.

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