History Off-Hand: Bunnell's No-Man's Land

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Abstract

Background: To date, it remains unclear what inspired Dr Sterling Bunnell to start using the typical World War I military term *no-man's land* in hand surgical context, only in 1948. To commemorate that Bunnell passed away 60 years ago on August 20, I report on my quest to clarify this. **Methods:** An extensive bibliography of Bunnell was made up by use of the McDowell Series of Plastic Surgery Indexes and cross-checked by use of a PubMed search. Bunnell's *round-robin letters* were searched for in the Sterling Bunnell Hand Surgery Archives of the California Pacific Medical Center Health Services Library in San Francisco, California. In addition, some of the second-generation hand surgeons were personally approached to try and trace the *round-robin letters*. Finally, the publications of the chiefs of the 9 hand surgical centers and 6 coworkers of Bunnell were checked for referrals to the term *no-man's land*. **Results:** Prior to 1948, *no-man's land* was not used in print in hand surgical context. Bunnell's nearness to the trenches during World War I appears not to have inspired him immediately to start using the term. The reconnaissance tunnels dug through the soil of the no man's land between the Allied and German trenches likely inspired him to replace a cut tendon through incisions proximal and distal to *no-man's land*. **Conclusions:** Bunnell must have associated his tendon grafting techniques to that of the World War I trenches and tunnels at some time between 1947 and 1948.

Keywords: hand surgery, Sterling Bunnell, history of medicine, tendon grafting, no-man's land

Introduction

Born one decade after his idol Charles Darwin's demise, the American father of hand surgery Dr Sterling Bunnell (1882-1957) initially developed a scientific interest in comparative anatomy.⁷ His comparison of the avian, amphibian, and human anatomy of the cranial skeletal outgrowth (or upper limb) still stands out.^{9,13,15} After graduating from the University of California Medical School at San Francisco in 1908, Bunnell continued doing experimental work on tendons nerves and problems related to the extremities in the university's laboratories for some time.²² He spent additional time with thyroid surgeon George W. Crile in Cleveland, Ohio, to return to California to start his own practice in general surgery in the greater San Francisco area.⁵ From May 1917 to March 1919, Captain Bunnell saw active service in Beaune, France, as a member of the neurosurgical Operating Team 101 connected with Base Hospital 47 (Figure 1).^{22,23}

In France, he further developed his clinical and surgical interest in the hand,²² and his first paper on hand surgery was published in 1918.¹² Although it took until the World War II for surgery of the hand to be recognized as a medical

specialty,³³ Bunnell deepened his knowledge and kept up a regular stream of publications on the subject. In 1944, this stream culminated in the first edition of his monumental book *Surgery of the Hand*.¹³

Almost at the same time that the book was published, the American Surgeon General Norman T. Kirk designated Bunnell as special civilian consultant in hand surgery to the Secretary of War, thereby acknowledging the importance of adequate treatment of battle-related hand injuries.^{23,31,33} Throughout the Interior Zone of the United States, military Hand Surgery Centers were established in 9 hospitals. Between November 1944 and February 1947, Bunnell made 8 tours of these hand centers and other Army general hospitals (Figure 2). In each hospital, an intensive course lasting 3 to 4 days was given and, in addition to the formal

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Figure 1. Dr Sterling Bunnell (1882-1957) when he was in active service, in or around 1917.

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Figure 2. Dr Sterling Bunnell (third from left, standing) during a visit to one of the Army Hospitals, in 1945.

Source. Reprinted with permission from the Robert Chase Library Web site of the American Society for Surgery of the Hand. <http://assh.pastperfect-online.com/40095cgi/mweb.exe?request=image&hex=199600111-1.JPG>.

Note. Joseph H. Boyes (far left, standing), Darrel Shaw (far right, standing), Robert Payne Jr (far left, kneeling), and S. Benjamin Fowler (second from left, kneeling) were stationed at Newton D. Baker General Hospital in Martinsburg, West Virginia.

teaching, Bunnell made rounds and performed surgery.³³ In all, 23 courses were given in 20 different hospitals and 49 more visits were made to 27 other general hospitals.³¹

Bunnell was a man of little words but fierce opinions.⁶ He had a way of expressing himself in epigrams, and “atraumatic surgery” and “no-man’s land” are the two that became best known.^{6,7,25} While it is immediately clear from his early hand surgical publications what inspired Bunnell to use the term *atraumatic surgery*,^{7,10,12,28} it remains unclear

what triggered him to start using a typical World War I military term in hand surgical context, only in 1948. To commemorate that Bunnell passed away 60 years ago on August 20, I report on my quest to clarify this.

Materials and Methods

A bibliography of Bunnell was made up by use of volumes II through IV the McDowell Series of Plastic Surgery Indexes and cross-checked by use of a PubMed search on Bunnell as author.^{27,29,32}

The *round-robin letters* with which Bunnell corresponded with the surgeons at the Army Hand Surgery Centers in the period between the incentive of these centers in 1944¹⁷ and the appearance of the Correspondence Newsletters of the American Society for Surgery of the Hand (ASSH), as of 1947,³¹ were searched for in the Sterling Bunnell Hand Surgery Archives of the California Pacific Medical Center Health Services Library in San Francisco, California. In addition, some of the second-generation hand surgeons (Drs Adrian E. Flatt, William L. Newmeyer, Daniel C. Riordan, Robert E. Carroll, Lee Milford, George E. Omer, Jack W. Tupper, and Harold E. Kleinert) were personally approached to try and trace the *round-robin letters*.

The publications of Drs Joseph H. Boyes, Robert L. Payne Jr, Darrel T. Shaw, George V. Webster, and Donald B. Slocum, all of whom worked closely with Bunnell during these years,³¹ were traced using PubMed and checked for referrals to the term *no-man’s land*. Likewise, the publications by the chiefs of the 9 hand surgical centers that Bunnell helped establish in the Interior Zone (Drs J. William Littler, Gilbert Hyroop, Walter C. Graham, S. Benjamin Fowler, Lot D. Howard Jr, Arthur J. Barsky, George S. Phalen, William H. Frackelton, and Donald R. Pratt)³¹ were studied for any use of the term.

Results

Bunnell’s First Use of No-Man’s Land in Hand Surgery Context

Bunnell first printed use of *no-man’s land* occurred on pages 445, 626, 627, and 628 of the second edition of his book, in 1948.^{14,30} He explained *no-man’s land* as “anywhere from the distal crease in the palm to the middle crease in the finger” to, further on, refer to “what is called no-man’s land.”^{14(pp445,626)} It has been suggested that Bunnell used the term as early as 1934 and that the offhand manner in which he used it in his book suggests that it was used commonly in communication among hand surgeons.³⁰

Still, Bunnell did not refer to the term in the first edition of his book, nor in any of his other 28 publications on hand surgery that were published prior to 1948.^{27,29,32} Although I have not been able to trace the *round-robin letters*, they probably did not contain any reference to the term because the ASSH Newsletters circulated by Drs Jack W. Tupper, L.

Lee Lankford, and David A. Labosky up to 1949 did neither. The term was not quoted in the proceedings of the formal Organizational Meeting of the ASSH on January 20, 1946, or in these of its first scientific meeting on “War Injuries” in January 1947.³³

Drs Boyes, Payne, Shaw, Webster, and Slocum did not use the term in print prior to 1948. Neither did any of the 9 chiefs of the hand surgical centers who made up the audience during Bunnell’s lectures held in the Army hospitals between 1944 and 1947. As such, Dr Walter C. Graham did not refer to the term when he presented his paper on flexor tendon grafts to the finger and thumb at the Annual Meeting of The American Academy of Orthopaedic Surgeons on January 30, 1947,²⁰ while he did in 1950.¹⁹

For these reasons, it appears highly unlikely that the term was commonly used among hand surgeons after an introduction by Bunnell as early as 1934. Rather, the term started being used after an initial use by Bunnell, in 1948.

Bunnell’s Inspiration for No-Man’s Land

In his kind reply to some inquiries, Dr Adrian E. Flatt from Dallas, Texas, remarked that “Bunnell was using a common phrase of those of his age group during World War I, when there were enormous lines of trenches on both the Allied and German sides.” Flatt continued that

[t]here was a vacant piece of land between the parallel lines of trenches. This was covered by machine gun fire from both sides and resulted in the slaughter of thousands and thousands of young men. This is why it was called no-man’s land. In effect it was saying no man should trespass on that area. (A. E. Flatt, personal communication, 1995)

Indeed, the term *no-man’s land* has been used to indicate such a tract of battled-over land over which neither of the opposing armies has established control or, even, any unowned or unclaimed stretch of barren land, since the early 14th century (Figure 3).^{30,37} The only exception seems to be Nomans Land Island in Massachusetts which commemorates not some forgotten incident but is taken from an Indian chief named Tequenoman.²

Bunnell’s scarce use of *no-man’s land* in print does not provide any insight into the moment and source of his inspiration. His nearness to the French trenches during World War I appears not to have immediately inspired him to start using *no-man’s land* in its hand surgical context. When visited by her husband’s residents, Mrs. Bunnell told how her husband submitted his first paper on flexor tendon repair many, many times for publication and each time it was rejected he doggedly rewrote it and resubmitted it.⁸ After more than a dozen and a half rejections, it was finally accepted by *Surgery, Gynecology and Obstetrics*,¹² “but, by then,” Mrs. Bunnell reportedly said, “I was so sick of seeing that thick brown envelope returned again and again in the

Figure 3. Road sign on a quiet back road in the county of Cornwall, England, where *no-man’s land* is being used to indicate an unowned or unclaimed stretch of land, rather than a tract of battled-over territory. If large enough, such a stretch of land could be use by nearby cattle or sheep owners as common grounds to graze their herds.

mail, that I wanted to hear no more of it.”^{8(p356)} This process of (re-)submissions must have taken most of the years of war but, even during the final of the revisions, it had not obviously come to Bunnell’s mind to use the term *no-man’s land* in order to indicate the problematic zone he described while he was still in France.¹² Hence, citing this early work as the first printed source of Bunnell’s use of the term *no-man’s land* is a mistake.

From his period of active service in France during World War I, however, Bunnell must have remembered the practice of German, French, Australian, and British miners to dig reconnaissance tunnels and explosive chambers through the soil of the *no-man’s land* between the Allied and German trenches.³ Rather than only the stretch of barren land between the trenches, the work of these tunnelers (or *sappers*) may have inspired him to replace a cut tendon through incisions on both sides outside *no-man’s land* (Figures 4 and 5).¹² It appears that this must have triggered him to use *no-man’s land* as a hand surgical term, but only at some time between the January 1947 meeting on “War Injuries” and his finishing the revision of the text of his book for its second edition, in 1948. His must have been a sudden flash of intuition.

Discussion

How No-Man’s Land Became Skilled-Man’s Land

Remarkably, Bunnell did not use the term again in any of his 17 hand surgical articles listed as of 1948.²⁹ Hence, his personal use of the term in print was only repeated in his 1955 report to the Secretary of War¹¹ and in the third edition of *Surgery of the Hand* in 1956. Subsequent editions (1964 and 1970) were edited by Dr Joseph H. Boyes and still contained the term.⁴ Meanwhile, most publishing hand surgeons around the world had started to use the term in print.

Figure 4. Copy of an original drawing by the British army showing a tunnel passing underground through *no-man's land* from well behind the British front line (blue shaded lower line) to well beyond the German front line (red shaded upper line), and 3 explosive chambers.

Source. Reprinted with permission of The National Archives of the United Kingdom from the Royal Engineers Mining 2nd Army Offensive schemes (Catalog reference WO 153/909).

Note. This scheme is reminiscent of the illustrations of Bunnell's illustrations of the use of a tendon graft passing the palmar *no-man's land* (see Figure 5).

While Bunnell kept warning against the primary suture of flexor tendons in *no-man's land*, the great Chicago hand surgeons Sumner L. Koch, Michael L. Mason, and Harvey S. Allen never wavered from their advocacy of direct tendon suture in the area.¹ Because Bunnell also performed such primary repairs himself,^{21,28,30} his continued warning reflected Bunnell's concern that such patients might be handled by less qualified surgeons causing disastrous outcomes.²⁶ The power of the term *no-man's land* and the influence of Bunnell made that his 1918 dictum that suturing the flexor tendon at the level of its sheath "will give function, but not as complete function as can be obtained by the graft of tendon in its tendon sheath"^{12(p104)} was respected for well over 50 years. Consequently, the paper on the results of primary repair of flexor tendons in *no-man's land* presented by Dr Claude E. Verdan, in 1959,³⁵ had an enormous impact on the Annual Meeting of the American Society for Surgery of the Hand in Chicago.¹⁶ Even in 1967, Kleinert et al²⁴ were still met with skepticism when they first reported their excellent results of primary repair of lacerated flexor tendons in

Figure 5. This figure is newly made after an illustration of the use of a tendon graft (Figure 350-B on page 422)¹⁴ with an illustration of *no-man's land* (Figure 731 on page 594),⁴ both in Dr Bunnell's *Surgery of the Hand*.

Note. By combining the information from both originals, it shows how a tendon graft was used from well above the distal palmar crease to well beyond the level of the middle finger joints. Bunnell's original legend stated that "through an incision in the wrist the sublimis and profundus tendons of the long finger were freed with a stripper to the far end of the palm, where they blended to scar tissue, and were drawn out of the arm. Through an L-shaped incision in the distal crease of the finger the distal end of the profundus tendon was stripped down through the finger until it tapered out. It was withdrawn from the finger and cut off. The sublimis tendon was cut off high in the forearm. With the expanded probe a channel was dilated in the finger and the free graft of the sublimis tendon was drawn through and used to bridge the gap in the profundus tendon."^{14(p422)}

no-man's land as "one gathered that he [Boyes] questioned the percentage of good results without any failures."^{24(p577)} Boyes persisted in his use of *critical zone* when referring to the area.

By 1974, it was accepted that only qualified surgeons should attempt primarily repair of the flexor tendons and the area was referred to as *skilled-man's land*¹⁸ or *some-man's land*.^{1,24,25} In 1980, Verdan's less valuating term *zone II* was accepted as proper jargon by the first congress of the Federation of European Societies for Surgery of the Hand in Rotterdam, The Netherlands.^{34,36} Still, many hand surgeons continue to use Bunnell's original term *no-man's land*,³⁸ no doubt in reverence to the master's greatness.

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Ethical Approval

This study did not require approval by any institutional review board.

Statement of Human and Animal Rights

This article does not contain any studies with human or animal subjects.

Statement of Informed Consent

Informed consent was obtained when necessary

Declaration of Conflicting Interests

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References

1. Arons MS. Purposeful delay of the primary repair of cut flexor tendons in "some-man's-land" in children. *Plast Reconstr Surg*. 1974;53:638-642.
2. Banks CE. Annals of Chilmark—Nomans Land. In: Banks CE, ed. *The History of Martha's Vineyard Dukes County, Massachusetts (Volume II-Town Annals)*. Boston, MA: George H. Dean; 1911:71-74.
3. Barton P, Doyle P, Vandewalle J. *Beneath Flanders Fields—The Tunnellers' War 1914-18*. Stroud, UK: Spellmount History Press; 2004.
4. Boyes JH. *Bunnell's Surgery of the Hand*. Philadelphia, PA: Lippincott; 1964.
5. Boyes JH. *On the Shoulders of Giants—Notable Names in Hand Surgery*. Philadelphia, PA: Lippincott; 1976.
6. Boyes JH. Sterling Bunnell—in appreciation. *J Bone Joint Surg*. 1958;40:214-216.
7. Boyes JH. Sterling Bunnell, 1882-1957. *J Hand Surg*. 1982;7:217-220.
8. Brown PW. Recollections of Sterling Bunnell. *J Hand Surg*. 1989;14:355-356.
9. Bunnell S. Aeronautics in bird flight. *The Condor*. 1930;32:269-287.
10. Bunnell S. An essential in reconstructive surgery—atraumatic technique. *Cal State J Med*. 1921;19:204-207.
11. Bunnell S. *Hand Surgery*. Washington, DC: Office of the Surgeon General, Department of the Army; 1955.
12. Bunnell S. Repair of tendons in the fingers and description of two new instruments. *Surg Gynaecol Obstet*. 1918;26:103-110.
13. Bunnell S. *Surgery of the Hand, 1st ed*. Philadelphia, PA: Lippincott; 1944.
14. Bunnell S. *Surgery of the Hand, 2nd ed*. Philadelphia, PA: Lippincott; 1948.
15. Bunnell S. Surgery of the intrinsic muscles of the hand other than those producing opposition of the thumb. *J Bone Joint Surg Am*. 1942;24:1-31.
16. Chamay A. L'histoire de la Chirurgie des tendons fléchisseurs. *Ann Chir Main*. 1997;16:9-15.
17. Curtis RM. Surgery of the hand—its past, present, and future. *J Bone Joint Surg Am*. 1971;53:810-812.
18. de Boer A, Robinson PH, Huffstadt AJC. Veranderde inzichten over buigpeesletstels in duim en vingers [Changed viewpoints on flexor tendon injuries of the thumb and fingers]. *Ned T Geneesk*. 1982;126:361-365.
19. Graham WC. Delayed tendon repairs. *Am J Surg*. 1950;80:776-779.
20. Graham WC. Flexor tendon grafts to the finger and thumb. *J Bone Joint Surg Am*. 1947;29:553-559.
21. Green WL, Niebauer JJ. Results of primary and secondary flexor-tendon repairs in no man's land. *J Bone Joint Surg Am*. 1974;56:1216-1222.
22. Howard LD Jr. Sterling Bunnell MD—in memoriam. *Plast Reconstr Surg*. 1958;21:91-93.
23. Kirk NT. Sterling Bunnell. *J Bone Joint Surg Am*. 1958;40-A:488-490.
24. Kleinert HE, Kutz JE, Ashbell TS, et al. Primary repair of lacerated flexor tendons in "No Man's Land." *J Bone Joint Surg Am*. 1967;49:577.
25. Kleinert HE, Spokevicius S, Papas NH. History of flexor tendon repair. *J Hand Surg*. 1995;20:S46-S52.
26. Leddy JP. Flexor tendons—acute injuries. In: Green DP, ed. *Operative Hand Surgery*. Vol. II. 3d ed. New York, NY: Churchill Livingstone; 1993: 1823-1851.
27. Leutz A. *The Leuz Index 1921 A.D. to 1946 A.D.* Baltimore, MD: Williams & Wilkins; 1981.
28. Mason ML. Sterling Bunnell—in appreciation. *J Bone Joint Surg Am*. 1958;40-A:211-213.
29. McDowell F, Kramer B, McDowell M. *The Great Index of Plastic Surgery 1946 A.D. to 1971 A.D.* Baltimore, MD: Williams & Wilkins; 1981.
30. Newmeyer WL, Manske PR. No man's land revisited: the primary flexor tendon repair controversy. *J Hand Surg Am*. 2004;29:1-5.
31. Omer GE. Development of hand surgery: education of hand surgeons. *J Hand Surg*. 2000;25:616-628.
32. Patterson TJS. *The Patterson Index 1864 A.D. to 1920 A.D.* Baltimore, MD: Williams & Wilkins; 1981.
33. Reid RL. Hand surgery and the military: a historical review. *Mil Med*. 1979;144:385-388.
34. Schepel SJ. *Buigpeesletstels in De Hand. Een Experimenteel En Klinisch Onderzoek* [Flexor tendon lesions of the hand. an experimental and clinical study (Academic thesis)]. Rotterdam, NL: Erasmus University; 1982.
35. Verdan CE. Primary repair of flexor tendons. *J Bone Joint Surg Am*. 1960;42A:647-657.
36. Verdan CE, Michon J. Le traitement des plaies des tendons fléchisseurs des doigts. *Rev Chir Orthop*. 1961;47:285-425.
37. *Webster's College Dictionary*. New York, NY: Random House; 1991.
38. Wong J, McGrouther DA. Minimizing trauma over "no man's land" with flexor tendon retrieval. *J Hand Surg Eur Vol*. 2014;39:1004-1006.