

On tumours in voluntary muscles : with an analysis of sixty-two cases and remarks on the treatment / by W.F. Teevan.

Contributors

Teevan, William Frederic, 1834-1887.

Publication/Creation

[Place of publication not identified] : [publisher not identified], [1863]
(London : H. Mitchener.)

Persistent URL

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ON TUMOURS
IN
VOLUNTARY MUSCLES

WITH AN
ANALYSIS OF SIXTY-TWO CASES AND REMARKS
ON THE TREATMENT.

BY
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[Reprinted from the British and Foreign Medico-Chirurgical Review.]

ART. V.

On Tumours in Voluntary Muscles; with an Analysis of Sixty-two Cases and Remarks on the Treatment. By W. F. TEEVAN, B.A., F.R.C.S., Surgeon to the West London Hospital, Demonstrator of Anatomy at the Westminster Hospital, and formerly Demonstrator of Anatomy at University College, &c.

TUMOURS affecting muscles, in common with other parts, are not infrequent, but it is exceedingly rare to find them developed and isolated in the body of a muscle. For the surgeon they possess great practical interest, and, so far as I have been able to ascertain, but little mention of them is to be found in any author, no statistics have been collected regarding them, and no definite rules laid down for their treatment.

T. W. Chevalier, who obtained the Jacksonian prize essay in 1822, for his dissertation on the 'Injuries and Diseases of the Muscular System,' has made a few remarks on 'Tumours, as affecting Muscles.' "They are, for the most part, independent of the muscles, unless being confined under them they encroach and irritate and so form adhesions, or unless they may have begun in the cellular substance which partly composed those organs." Nearly all his evidence is entirely of a negative character.

According to Rokitansky,* "The muscular system is rarely the seat of morbid growths, except when it is involved in those which have originated in other tissues."

Gross† is of opinion that "Various morbid growths occur in and among the muscles."

In Holmes's 'System of Surgery,'‡ it is stated that "Tumours of different kinds are occasionally found in muscles."

J. C. Warren,§ in his well-known work, when considering "muscular tumours," states—"These are formed in the substance of the muscles. They are not very common. On external examination they are less distinctly defined than steatomatous tumours, and less moveable. When the muscles in which they are situated are perfectly relaxed they possess a considerable mobility; when they are firmly contracted the tumour is quite fixed, and these circumstances constitute their most remarkable character. The diseased part is not very easily distinguished from the healthy; so that in operation it is necessary to trench deeply into the surrounding muscle. They are more frequently accompanied with pain than cellular tumours; and more disposed to degenerate into malignant affections. Their origin is often traceable to an accidental injury, a blow, strain, or continued pressure. After removal they are apt to reappear." He also relates a few cases, the nature and origin of some of which must be considered very doubtful.

* Sydenham Society's edition, vol. iii. p. 312.

† Holmes's Surgery, vol. iii. p. 539.

‡ Gross's Surgery, vol. i. p. 747.

§ Warren on Tumours, p. 64.

Bouisson* makes some general remarks—"Les tumeurs qui se développent dans l'épaisseur des muscles, et dont on possède une connaissance exacte, sont encore fort peu nombreuses. Le cœur est le seul organe musculaire dans lequel on ait signalé des productions morbides variées; mais ces lésions n'intéressent qu'au point de vue de l'anatomie pathologique, et souvent elles ne sont reconnues qu'au moment de l'autopsie. Quant aux muscles de la vie animale, ils ont à peine été compris dans les investigations qui pouvaient éclairer ce sujet; et si l'on excepte quelques tumeurs inflammatoires, quelques hypertrophies limitées, divers kystes contenant des liquides ou des entozoaires de différentes espèces, c'est à peine si l'on a recueilli quelques cas de tumeurs, résultant d'une lésion spéciale du tissu musculaire, et dans lesquels la symptomatologie et la thérapeutique aient été l'objet d'une attention fructueuse."

Parmentier† has made some remarks on cancerous tumours in muscles, and Demarquay‡ has written a chapter on erectile tumours in muscles. To both these authors I shall have occasion to refer.

Liston§ stated, "Structural disease of any kind in muscle is indeed but rarely encountered."

Various writers have discussed the subject of syphilitic tumours in muscles. It is not my intention to include them in the class of cases under consideration, for I think they scarcely come under my definition, and ought rather to be looked upon as inflammatory swellings or exudations. I may mention, however, that to Bouisson belongs the merit of having been the first to point out their pathology and treatment.

I have from different sources collected the records of upwards of one hundred cases of tumours in muscles, but as, in many instances, the tumour affected several contiguous muscles, it might be fairly objected, that the growth did not originate in the body of the muscle, but in the intermuscular space. I have therefore excluded all such. Although the tongue is often the seat of tumours, yet its muscles are so small that it would be exceedingly difficult to single out any one as affected in a given case. For the same reason many other muscles will also escape notice.

In selecting the extracts of cases I have endeavoured, as briefly as possible, to state only some of the more important facts, leaving the reader to refer to the authorities named for the details. In several instances the cases were wanting in particulars. The following are arranged according to the frequency of each description of growth:

1. *Medullary cancer* in the *pectoralis major* of a female, aged thirteen. The tumour, which was the size of the fist, and supposed to have been caused by a fall, was excised. The recurrence took place before the wound was closed, and death ensued a few months afterwards. (Compend. de Chirurgie, tome ii. p. 205.)

* Tribut à la Chirurgie, tom. i. p. 538.

† L'Union Médicale, Août 29 and 31, 1861.

‡ Ibid., Dec. 26, 1861.

§ Med. Chir. Soc. Trans., vol. for 1843, p. 127.

2. *Medullary cancer* in the *pectoral* muscle of a male. It was of large size, of eleven months' duration, supposed to have been caused by a sprain, and quickly proved fatal. (St. George's Hosp. Mus., Series 5.)

3. *Medullary cancer* in the *pectoralis major* of a man, aged thirty-four. It was as large as a melon, and of two years' duration. The tumour and entire muscle were excised, and death ensued on the twelfth day. (Ed. Med. and Surg. Journ. vol. ii. for 1861, p. 612.)

4. *Medullary cancer* in the *gluteus maximus* of a man, aged sixty-six. It was as large as a hen's egg, and of two months' duration. Excised. (L'Union Médicale, Août 29, 1861.)

5. *Medullary cancer* in *gluteus maximus* of a woman, aged fifty-five. The tumour was of the size of an adult head. It was excised together with part of the muscle. Recurrence took place in five weeks, and death followed three weeks after. (Med. Times and Gaz., vol. xxxvii. p. 655.)

6. *Medullary cancer* in the *sartorius* of a man, aged fifty-eight. The growth, which was as large as an adult head, and of two years' duration, was supposed to have been caused by laceration of the muscular fibres some years previously. Excision, followed by recurrence. (Lancet, vol. i. for 1861, p. 287.)

7. *Medullary cancer* in the *sartorius* of a young man. There were several tumours of a similar nature round the hip-joint of the same side. (St. George's Hosp. Mus., Series 5.)

8. *Medullary cancer* in the *deltoid* of a female, aged twenty-three. The growth was of small size and was excised. Fungoid tumours were reproduced in the vicinity and attained an enormous volume. Death took place two years after the operation. (St. Thos. Hosp. Mus., No. 32.)

9. *Medullary cancer* in the *deltoid* of a man, aged forty-two. The tumour was as large as an orange, of six months' duration, and grew in the same place as that from which a recurrent fibroid tumour had been removed some time previously. Excised. (Lancet, vol. i. 1861, p. 315.)

10. *Medullary cancer* in the *rectus abdominis* of a female, aged fifty. There was also a cancerous tumour in the left labium. At the post-mortem all the internal organs were found quite free from malignant disease. (Dub. Hosp. Gaz., April 1, 1846, p. 254.)

11. *Medullary cancer* in the *rectus abdominis* of a female aged forty. Death took place from melanosis. (L'Union Médicale, Août 31, 1861.)

12. *Medullary cancer* in *biceps humeri* of a man, aged thirty-seven. The tumour, which was of one year's duration, was excised. Recovery. (Lancet, vol. ii. 1862, p. 700.)

13. *Medullary cancer* in short head of *biceps humeri* of a male and of two years' duration. Was excised and followed by recurrence. (St. George's Hosp. Mus.)

14. *Medullary cancer* in *soleus* of a female, aged fifty. The tumour was very large, and of two years' duration; was excised, and death

ensued from consecutive hæmorrhage. At the post-mortem, no trace of cancer could anywhere be found. (L'Union Médicale, Mars 6, 1851.)

15. *Medullary cancer* in the *rectus femoris* of a male, aged seventy. This tumour, which was of the size of the fist and of two months' duration, was supposed to have been caused by a fall. It was excised, and recurred four times. (L'Union Médicale, Août 29, 1861.)

16. *Medullary cancer* in the *biceps femoris* of a young woman. Amputation at hip-joint, followed by recovery. A previous growth had been excised. (Exhibited at Path. Soc., Jan. 6, 1863.)

17. *Medullary cancer* in the *gastrocnemius* of a male, aged eighteen. The tumour, which was of nine months' duration, was excised. It rapidly grew again, and was excised a year after the first operation. Three weeks afterwards fungoid tumours appeared in the sore, and the leg was amputated above the knee. Death took place ten weeks from date of amputation. At the post-mortem no cancerous deposit was found in any other part of the body. (St. Thos. Hosp. Mus., No. 30.)

18. *Medullary cancer* in the *crureus*. There were two tumours, each the size of a walnut, contained in cysts. (Bull. de la Soc. Anat. de Paris, vol. for 1859, p. 10.)

19. *Scirrhus cancer* in the *brachialis anticus* of an old woman, of three years' duration and the size of an orange. The arm was amputated, and patient recovered. (Lancet, vol. i. 1860, p. 118.)

20. Several small, "oval, hard, and white" carcinomatous tumours in a *pectoral* muscle. The fasciculi were described as healthy. (Mus. R. C. S., No. 345.)

21. *Melanotic cancer* in the *rectus femoris* of a young female. The tumour was encysted, of the size of a hen's egg, and of six months' duration; was excised, and patient recovered. (J. C. Warren on Tumours, p. 65.)

22. *Fibrous* tumour in the *biceps humeri*. It was of the size of a walnut, and was taken from the body of a man, aged sixty-five, who died from chloroform when about to have the thigh amputated for a large tumour of the same nature. (Trans. Path. Soc., vol. vii. p. 340.)

23. *Fibrous* tumour in the *deltoid*. (Lancet, vol. i. 1857, p. 186.)

24. *Fibrous* tumour in the *gastrocnemius* of a girl, aged nine. It was of ten months' duration, and the size of a walnut; was partly excised, but recurred, and leg was amputated above knee-joint. (Trans. Path. Soc., vol. vi. p. 345.)

25. *Fibrous* tumour in the *pectoralis major* of a female, aged forty, of the size of a hen's egg, and followed a blow. Excision; recovery. (Lancet, vol. i. 1861, p. 264.)

26. *Fibrous* tumour of *trapezius*. It occurred in a female, aged fifty-five, was of nine months' duration, and was excised. A previous growth had been removed. (Mus. R. C. S., 222 a.)

27. *Fibrous* tumour from the *vastus internus*. (Bull. de la Soc. Anat. de Paris, vol. xix. p. 78.)

28. *Fibrous* tumour in a muscle not named. (Mus. St. Barth. Hosp., No. 305.)

29. *Fibro-adipose* tumour in the *pectoralis major* of a male, aged twenty-nine, was as large as an orange, of four years' duration, and was excised. (Lancet, vol. 1857, p. 186.)

30. *Fibro-adipose* tumour in the *biceps humeri* of a man, aged nineteen. The growth, which was four ounces in weight, and of one year's duration, was excised, and followed by recovery. (Lancet, vol. i. 1854, p. 518.)

31. *Fibro-plastic* tumour in the *pectoralis major* of a male, aged twenty-three. It was as large as a foetal head, of six months' duration, and was excised with nearly all the muscle. Two years later it recurred. (L'Union Médicale, Août 29, 1861.)

32. *Fibro-plastic* tumour, with osseous wall, in the *latissimus dorsi* of a young woman. It was excised, and patient recovered. (L'Union Médicale, Nov. 10, 1861.)

33. *Fibro-cartilaginous* tumour in the *semi-membranosus* of a boy, aged fourteen. It was of the size of a fist, and was excised. (Holmes' Surgery, vol. iii. p. 539.)

34. *Fibro-cartilaginous* tumour in the *deltoid* of a young man. It was the size of an egg, and was excised. (Holmes' Surgery, vol. iii. p. 539.)

35. *Recurrent fibroid* tumour in the *masseter* of a man. It was as large as a walnut, of four months' duration, and was excised. (Holmes' Surgery, vol. iii. p. 540.)

36. *Fibro-nucleated* tumour in the *rectus abdominis* of a male, aged twenty-seven, of the size of a turkey's egg, and supposed to have been caused by an injury. Excision; recovery. (Med. Times, vol. xxxii. p. 321.)

37. A tumour described as *albumino-sarcoma* in the *triceps humeri* of a boy, aged twelve; was as large as half an orange, of three years' duration, and was excised. (Med. Times, vol. xxxiii. p. 211.)

38. *Myeloid* tumour in the *deltoid* of a female, aged twenty-seven, of great size, and two years' duration. The entire muscle, with the acromion and scapular extremity of the clavicle, was excised. Recovery. (Med. Times, vol. xxxiii. p. 334.)

39. A *cyst* in the *biceps humeri* of a female, aged twenty, as large as a walnut. (Holmes' System of Surgery, vol. iii. p. 540.)

40. *Cysts* in the *biceps humeri* of a female, aged twenty-two. Were cut open, and allowed to suppurate. (Lancet, vol. ii. 1859, p. 662.)

41. A *serous cyst* excised from the *gluteus maximus*. (St. George's Hosp. Mus., Series 45.)

42. A *serous cyst* in the *rectus abdominis*. During lifetime the tumour was supposed to be a chronic abscess. (Lond. Med. Gaz., vol. xli. p. 217.)

43. A *cyst* in the *pectoral* muscle. (St. Barth. Hosp. Mus., No. 202.)

44. A *sanguineous cyst* in the *gastrocnemius* of a male, aged thirty-three. It contained half a pint of blood, and was of long duration. (Trans. Path. Soc., vol. viii. p. 363.)

45. A *cystic* tumour in the *adductor magnus* of a boy, aged four-

teen. It was as large as the adult head, and of nearly two years' duration. Excision of part, followed by death in forty-eight hours. (Lancet, vol. i. 1856. p. 371.)

46. A *cyst* in the *sartorius*, containing cretaceous matter. (Bull. de la Soc. Anat. de Paris, vol. for 1859, p. 10.)

47. A *hydatid* tumour in the *biceps humeri*. (L'Union Médicale, Août 31, 1861.)

48. A large *acephalocyst hydatid* in the *gluteus maximus* of a female, aged forty. It was of five years' duration, was excised, and patient recovered. (Mus. R. C. S., No. 345.)

49. A *hydatid* cyst in the *rectus abdominis* of a man. (Comptes Rendus de la Soc. de Biol., vol. for 1852, p. 6.)

50. A *hydatid* in *rectus abdominis*. (Mus. R. C. S., No. 597.)

51. A small *hydatid* tumour in the *deltoid* of a man, aged seventy. It was the size of a walnut, and of six months' duration. (Gross' Surgery, vol. i. p. 747.)

52. *Erectile* tumour in the *semi-membranosus* of a male aged ten, of eight years' duration. Excision; recovery. (Med.-Chir. Soc. Trans., vol. for 1843, p. 120.)

53. *Erectile* tumour in the *external oblique*. It was of congenital origin, and was excised. (Med. Times, vol. xxxii. p. 321.)

54. *Erectile* tumour in the *supinator longus* of a female, aged twenty-eight. It was of nine years' duration, and was excised. Recovery. (L'Union Médicale, Dec. 26, 1861.)

55. *Erectile* tumour in the *semi-tendinosus* of a female, aged seventeen. Excised. (St. Barth. Hosp. Mus., No. 118.)

56. *Erectile* tumour in the *sterno-mastoid*. The growth was of four years' duration, and as large as a turnip. Its excision was followed by recovery. (Med.-Chir. Soc. Trans., vol. for 1843, p. 128.)

57. An *osseous* tumour in the *adductor longus*. (Bull. de la Soc. Anat. de Paris, vol. xv. p. 396.)

58. An *osteo-calcareous* growth in the *extensor communis digitorum*. (Bull. de la Soc. Anat. de Paris, vol. xxiii. p. 15.)

59. An *osseous* tumour in the *rectus femoris* of a male, aged fifty-six. Death from cancer of the stomach. (Bull. de la Soc. Anat. de Paris, vol. xxx. p. 3.)

60. Tumour, described as *muscular*, in the *sterno-mastoid* of an old woman, and supposed to have been caused by a blow. It would appear to have been a cyst. (Lancet, vol. ii. 1861, p. 349.)

61. Tumour, described as *muscular*, in the *masseter* of a man, aged thirty-five. Excision; recovery. (Med. Times, vol. xxxiv. p. 243.)

62. Tumour, described as *innocent*, in the *sartorius* of a female. Excision; recovery. (Amer. Med. Jour., April, 1853, p. 363.)

It will thus be seen that out of 62 cases the relative numbers of each growth were—cancerous, 21; fibrous, alone and in combination, 16; cystic, 8; hydatid, 5; erectile, 5; osseous and osteoid, 3; doubtful nature, 3; myeloid, 1. The cancerous tumours were the most numerous, being rather more than one-third of the whole; but, from an examination of the other cases that I have excluded, I am convinced

that their proportion is very much greater than this. It would also appear that the tumours affected the muscles of the lower extremity almost as often as they do those of the upper limb; but with this difference, that in the latter they are almost entirely confined to the pectoralis major, deltoïd, and biceps, whereas in the former they are very equally distributed. The muscles of the trunk, and head, and neck were rarely the seat of tumours, with the exception of the rectus abdominalis, which would appear very subject to them.

The above facts are somewhat opposed to the opinions of the authors already named; for Gross states that he had only seen one case of hydatids, that melanosis may occur, but that encephaloïd, colloïd, and scirrhus are very rare. Tatum thinks the fibrous tumour is the most frequent, that encephaloïd may exist, but that scirrhus seldom obtains. Rokitsansky is of opinion that cysts, with the exception of those that enclose entozoa, are very rare, that bony growths not unfrequently exist, but that cancerous formations are extremely uncommon. Chevalier was not aware of any case of hydatids in the voluntary muscles, and thought that cancer never began in them. Erectile tumours must be exceedingly rare. I have only been able to meet with three cases, in addition to the two described by Liston,* who states, in reference to one of them, "The author is not aware of its having been found in muscular substance. In the preceding case, however, it is more than probable that a small mass of erectile tissue had originally existed in the muscle, and had gradually become developed, till, at two years of age, it attained such a size as to attract attention." Rokitsansky mentions that a growth composed of true bone is often found in the left deltoïd muscle of recruits, and hence named the drilling bone. I believe the earliest recorded case is to be found in the '*Journal der Chirurgie und Augen-Heilkunde*,' for 1830, p. 141. This curious pathological specimen does not seem to have been observed in this country.

It is a remarkable fact, that lipoma, which is so frequent in the subcutaneous cellular tissue, has never as yet, I believe, been found in the interfibrillar connective tissue. Parmentier is, I think, the only author who has pointed out this singularity, and he goes so far as to say that, when diagnosing a tumour in a muscle, we may entirely discard the chance of its being lipomatous.

Is there any such growth in the voluntary muscles composed of striped fibre which would merit being called a true "muscular tumour"? In the prostate and uterus there are, without doubt, new formations made up of unstriped fibres, but I have not been able to meet with any case to which the above name could be applied. The few that I have met with described as muscular admit of great doubt. Paget states,† "I have not, indeed, seen such a specimen as would quite justify the name of 'muscular tumour,' assigned by Vogel." Still, I think there is no reason why it should not exist, for Rokitsansky has

* *Trans. of Med.-Chir. Soc.*, vol. for 1843, p. 127.

† Paget's *Surgical Pathology*, p. 476.

met with transversely-striated cells in a tumour of the testis, and both Virchow and Kölliker have discovered "elongated, fusiform, transversely-striated cells" in an ovarian tumour. Virchow* expressly states that, in pathological formations, "those elements are most rarely imitated which belong to the more highly organized, and especially to the muscular and nervous systems. Still, these formations are by no means excluded; we find pathological new formations of every description, no matter to what tissue they may be analogous, provided it possess distinctive features. It is only with regard to their frequency and importance that a difference prevails."

Most writers are of opinion that the muscular system is only secondarily affected with cancer. Paget† states, "I have never seen a primary scirrhus cancer in a muscle." According to Rokitansky,‡ "in whatever form this disease presents itself, it is scarcely ever the primary cancerous affection in any muscle of animal life except the tongue. One or more cancerous growths are almost always found elsewhere, and that in the muscular system is the secondary affection." Walshe,§ however, inclines to an opposite belief. "Bayle states that the muscles of locomotion are not observed to be affected with primary cancer, in which respect they differ from those of organic life. The fasciculi of Cruveilhier, however, prove that small cancerous masses may be developed secondarily in the muscles of animal life, without any direct continuity with the original disease; and I have myself seen primary encephaloid infiltration of muscular substance." He is also of opinion that primary scirrhus may likewise occur. I think there can be no doubt that medullary cancer may exist in muscles as a primary growth or infiltration. Most of the cases of encephaloid that I have enumerated were primary cancers, and three of them were proved post-mortem to have been such. Primary scirrhus, however, must be excessively rare. I have only been able to meet with two cases of it, and they are both exceedingly doubtful. The preparation in the Museum of the College of Surgeons of a pectoral muscle, with several small, "oval, hard, and white" carcinomatous tumours in it, is, in all probability, an instance of that muscle secondarily affected in scirrhus of the breast.

Whence do tumours in muscle arise—from the fibril or the interfibrillar connective tissue? It would seem to have been the opinions of most writers that they arose in the interstitial connective tissue.

Gross|| expressed the general belief when he wrote: "The probability is that none of these heteroclit formations are developed in the muscular substance, properly so called, but that they begin in the interfibrillar tissue, from which, as they increase in size, they gradually encroach upon the fleshy fibres, which they thus displace, alter, or destroy." There can, I think, be no doubt that the non-malignant tumours originate in the interfibrillar tissue. The microscopical examinations of cases would seem entirely to point that way; and fibrous tumours can often be demonstrated as arising in the interstitial tissue,

* Cellular Pathology, p. 63.

† Op. cit. p. 608.

§ Walshe on Cancer, p. 97.

‡ Op. cit. p. 317.

|| Op. cit. vol. i. p. 748.

the muscular fibrils being wholly intact. Regarding the occurrence of cancer in muscle, it used also generally to be maintained that it had its origin in the same connective tissue. However, Cruveilhier and Lebert were the first, I believe, to point out that it sometimes arose in the fibril itself. They both brought forward cases in which they had discovered cancer "*dans l'intérieure des cylindres musculaires;*" and, in the last edition of Paget's work, it is stated that Weber, Neumann, and Turner have all demonstrated the development of cancer-cells in muscular fibril. It thus appears that cancer may commence either in the interfibrillar tissue or in the fibril, and that it may affect the latter as a distinct tumour, or as an infiltration, or as a degeneration, merely replacing the fibril, and not causing any alteration in the shape of the muscle. However, the fibril is far more likely to be diseased than the connective tissue, as is proved by the fact of the latter so often remaining wholly unaltered in fatty and cancerous degenerations of muscle, and the sheath of the muscle is the last to give way to disease, for nothing is more remarkable than the fact that in psoas abscess of many years' duration the sheath will be often found strong and resistant, and perhaps greatly thickened. It would, indeed, seem to be a conservative provision of nature, for it is very rare to find that pus has escaped into the abdomen. The sheath would seem to have fulfilled the office of a sewer, and to have conducted the pus to a point whence it might be harmlessly discharged. These facts, as will hereafter be seen, have a most important bearing.

Regarding the treatment of tumours in muscles. I desire to draw attention to two important points. Firstly, there is a class of swellings in muscles, the result of constitutional syphilis, which may simulate other growths, and so lead to probable error in diagnosis. It would seem that this description of tumour is very much more common than is perhaps supposed, for since attention was drawn to this point numerous cases have been, and constantly are being, recorded; and, when its cause is kept in mind, it is quite sufficient to put us on our guard lest a given tumour that we may happen to meet with be of this nature, and to remember always, though there may be no evidence nor history of syphilis, yet that its effects may make themselves manifest, from time to time, when the constitutional taint may long since have faded away.

The greatest experience, and the most consummate diagnostic tact, will sometimes fail to discriminate softer forms of encephaloid tumours from syphilitic swellings, when the skin is intact; and when we consider that operations have often been needlessly performed for growths supposed to be cancerous, but which turned out to be syphilitic, we cannot be too careful lest we also commit like errors. These swellings had long ago been observed by Astruc; and in Casper's '*Wochenschrift*' for 1845, a tumour in the sterno-mastoid was described which created considerable interest. In the same year also, Mr. Tatum read a paper at the Medico-Chirurgical Society, entitled, "*Three Cases of hard circumscribed Tumours in Muscle disappearing under the influence of Iodide of Potassium;*" and Nélaton states, that although he had

himself often observed these swellings before Bouisson wrote, yet that to the latter must be ascribed the merit of having been the first to clearly point out their pathology and treatment in the '*Gazette Médicale*' for 1846. Bouisson was not the first, however, to cure tumours with iodide of potash, for in 1836 Dr. Andrew Buchanan, then surgeon to the Glasgow Royal Infirmary, wrote a paper on the use of the drug for their absorption, and recorded that, by administering the medicine internally, he had cured a case in which the growth was situated in the calf of a woman's leg, although some surgeons had previously condemned the limb to be amputated. In 1839, Robert described a similar case. It is therefore of the greatest utility in doubtful tumours to administer this remedy for a few weeks, for it will either cure the disease or greatly facilitate the diagnosis. In most instances the delay of a few weeks can make but little difference; and, skin well not to take imaginary evils into calculation. Some surgeon has great objection to make an exploratory puncture, but I think the great and valuable evidence so often afforded by it far outweighs any disadvantage attending it. A cold abscess with thick walls, when seated in the body of a muscle, will often puzzle an able surgeon. Bérard once cut down on to an abscess in the biceps, thinking that it was a solid growth. It is well known that the diagnosis between cancer and syphilis, when seated in the tongue or lip, is often by no means easy. When syphilitic swellings first form in the muscles they are generally fluid, and, if punctured, will at once subside, but if they have passed from the stage of induration to that of ulceration, they may very much resemble a malignant tumour which has eaten through the skin. I think, therefore, that the exploring-needle and iodide of potash will be found useful auxiliaries in cases of difficult diagnosis.

Secondly, what operation, if any, ought to be performed for a cancerous tumour in a muscle?

Surgeons generally extirpate innocent tumours seated in the soft parts of the limbs, and not involving the bones. I think, however, when the tumour is very large, has deep connexions, or is situated in the thigh, that the practice is very questionable. On looking over the records of cases for some years past, I find there have been many instances of large innocent tumours in the thigh, especially in the inner side. They have generally been excised, and recovery from the operation has been quite the exception. Occurring, as they usually do, in young healthy subjects, the great mortality is still more remarkable. Some of the French surgeons have found the above line of treatment so uniformly fatal in their own practice for similar cases, that they have been led to adopt a different course, and I think their opinions are worthy of serious consideration. I believe the reasons for the great mortality are to be found in the facts of a prolonged dissection (often violent), the production of an enormous wound (often lacerated in its deeper parts), and the necessarily lengthened period that it is requisite to keep the patient under chloroform. Now in amputation the oppo-

site conditions obtain. Sanson and Robert* are both of opinion, that in these cases amputation is preferable to excision. "M. Robert se rappelle avoir observé plusieurs cas de ce genre. Les tumeurs occupaient toute la partie moyenne et interne de la cuisse, elles ne paraissaient pas adhérer aux os. Quatre fois il fit l'extirpation et quatre fois la mort s'ensuivit. La première malade était couchée à la Pitié dans le service de Sanson. Ce chirurgien, instruit déjà par des cas observés auparavant, proposait la desarticulation coxo-fémorale plutôt que l'extirpation, qu'il considérait comme nécessairement mortelle. . . . En résumé, M. Robert aujourd'hui conseillera plutôt l'amputation que l'ablation qui donne naissance à une plaie beaucoup plus grave." Maisonneuve extirpated the calf of the leg for a large tumour in it; the operation was fatal, and called forth the following remarks from Lepelletier, who witnessed and recorded the case:—"Après ce resultat il est permis de se demander si l'amputation de la cuisse n'aurait pas présenté plus de chances de succès. Telle est mon opinion; et peut-être M. Maisonneuve hésiterait-il à pratiquer de nouveau cette opération dans un cas semblable. Je ne crois pas que le désir de conserver un membre aussi important que la cuisse autorise une opération dont les suites peuvent être plus graves que celles de l'amputation. Si on considère en effet, l'étendue et la profondeur de la plaie produite par l'extirpation, on comprendra facilement à combien d'accidens graves la malade était exposée. Les suites de cette opération l'ont prouvé."

Chassaignac and Verneuil are also in favour of amputating rather than excising in these instances.

Not long ago, it was a doubtful point whether life were prolonged by operating in cases of cancer. Now, however, I think the matter must be considered to be set at rest by Mr. Sibley's and Mr. Baker's statistics, which clearly shew the increased average duration of life that is gained by operating. It is therefore the surgeon's duty to operate, unless, in a particular case, some condition or fact forbid it.

No doubt from year to year the belief of the profession will oscillate between the local and constitutional origin of cancer till the question is finally settled. At present, however, the opinion would seem to be strongly setting in favour of the belief that cancer is a local disease, and Dr. Wilks states that it has a majority of evidence on its side. The teachings of such men as Virchow and Hughes Bennett will tend strongly to strengthen this view, which is certainly the more utilitarian of the two, for who would devote his time and energies to find out a cure for the incurable? The *onus probandi* of the entire controversy clearly rests with those who assert that a cancer is a constitutional disease, and, until such affirmation be proved, no surgeon is justified in its belief.

What operation, then, ought to be performed for a cancerous tumour in a muscle? On searching the works of past surgeons, I come to the conclusion, that in cases of malignant disease affecting the soft parts of limbs, they generally amputated. If, however the present English

* Gazette des Hôpitaux, June 28, 1856.

surgical works be examined, it will be found that, in nearly all, no directions whatever are laid down as to what kind of operation is to be done in the above cases. Those that make any allusion to the subject, recommend the disease to be thoroughly cut out; one author only states that, "In the limbs, as a general rule, amputation is preferable to a local, which is often necessarily a partial, extirpation." The American surgeon is, however, very clear on this point. "A valuable rule in tumours is to excise the benign and to get rid of the malignant by amputation;"* and, "when the disease is seated in an extremity, especially the distal portion, the proper operation is amputation, not excision."†

I find, from an examination of the different journals for many years past, that surgeons generally excised cancerous disease when seated in the soft parts of limbs, and not involving the bones, and unvaryingly so when the skin was intact and the tumour had no deep connexions. They seemed to have been actuated by the very landable desire of preserving the limb, and to have founded their treatment on the same principle as that followed in a cancerous breast.

I shall now endeavour to show, that any operation, for the removal of a cancerous tumour in a muscle, which takes away the growth and leaves behind that structure in which the disease commenced is wrong in principle and contradicted by analogy.

If a malignant growth, however small, affected the mammary gland, no surgeon would ever think of excising that part of it which seemed diseased, leaving behind that which was apparently healthy; he would be content with nothing less than the excision of the entire breast; and if a tumour of the same nature affected the lower part of the femur, he would not amputate through that bone, but would disarticulate the limb at the hip-joint; in each case removing the whole of that structure in which the disease originated and was situated.

Why, therefore, should a surgeon cut a cancerous tumour out of a muscle, and leave behind the structure in which it commenced? It is clearly wrong; a malignantly affected structure ought always to be cut out and not cut through. The following observations apply almost verbatim to the subject: "Still, the ascertained fact of the encephaloid tumour being occasionally combined with unsoundness of bone to an indefinite extent, is sufficient to warrant the rule, that in such cases the amputation should, if possible, be performed not through the bone in which the disease originated, but either through the contiguous joint or above it."‡

Sir B. Brodie§ states: "It is to be observed, that in this instance the whole of the humerus—that is, the whole of the organ in which the disease was situated—was removed. It is probable that the success of the operation in such cases depends mainly on that circumstance." And further on|| he remarks: "I have no sufficient evidence to offer

* Op. cit. vol. i. p. 621.

† Op. cit. p. 329.

‡ Stanley on Diseases of Bone, p. 174.

§ Diseases of the Joints, p. 273.

|| Ibid. p. 278.

in favour of an operation performed for the removal of a joint affected with malignant disease, in which a portion of the bone in which the disease has originated, is allowed to remain. Cases may have occurred in which there was no recurrence of the disease under these circumstances; but there has been no such favourable result in any of those in which I have had the opportunity of learning the patient's history afterwards; and, as I have already observed, it is not what our experience of the effects of operation performed for malignant diseases in other organs would lead us to expect. I confess that it seems to me that the rule of practice is sufficiently obvious; though there may be some difficulty in the application of it to individual cases, on account of our having no certain marks by which we may at all times, and in every instance, distinguish diseases which are malignant, and diseases which are not malignant, from each other."

If it be asked, why cancer so often returns after operation, I think the answer is to be sought for, not in an hypothesis, but in the material and visible fact that a cancer is generally cut out of cancerously diseased structures, and hence a return of the growth is only an exemplification of natural processes. It rarely happens, that when a malignant tumour is brought under the surgeon's notice that it is confined to the structure or part in which it originated, and as the most frequent operation for cancer is the excision of the breast, and as that procedure must be called an imperfect operation on account of the surgeon being limited in his incisions, I believe, that where we can find a cancer confined to, and isolated in one given structure that is capable of being thoroughly excised *en masse*, we have every reason to hope for better results than have been attained in operations on cancerous breasts.

Now, when a cancer is seated in a muscle there are two important facts to be remembered. The muscle is as obnoxious to disease as its sheath is resistant to the spread of malignancy. Miller has pointed out that dense fibrous tissue resists the invasion of carcinoma longer than any other texture; and Virchow expressly states that it is very little disposed to become diseased by contagion, whereas the soft structure of muscle is well adapted for the conveyance of cancerous juices, and hence likely to encourage the formation of new foci of disease. When once a cancer has commenced in a muscle, there is every condition present to favour the transmission of its juices from one end to the other. Independently of all physiological action, I believe that capillary attraction, gravitation, and muscular action are all, more or less, capable of diffusing the elements of the disease. On the other hand, the sheath can for a long time serve as a barrier against the infiltrating fluids, and so protect the surrounding parts. If, when the cancerous tumour is still confined within the sheath, we excise the entire muscle, we may reasonably believe that we have thoroughly enucleated the disease.

When the growth is in the rectus abdominis muscle, and adherent to the peritoneum, I would recommend Parmentier's advice,* and it

* L'Union Médicale, Août 31, 1861.

must be remembered that the above muscle is practically several muscles: "Enfin, s'il s'agissait d'une tumeur développée dans le grand droit de l'abdomen, et offrant quelque adhérence avec le péritoine, il ne faudrait pas hésiter, contre l'avis de Boyer, à achever l'opération, car il vaut mieux avoir affaire à une plaie pénétrante de l'abdomen que de laisser dans l'économie un produit qui fatalement causera la mort du malade."

Therefore, whenever practicable, a cancerous tumour in a muscle should not only be excised, but the muscle in which it originated ought to be cut out from its origin to its insertion. But if the cancer be of large size, or if the skin be affected, or if the wound resulting from the excision of the muscle would be of great extent, then the limb ought to be amputated, and the remainder of the muscle in the stump excised.

I have thus ventured to propose an operation which is founded on definite principles, is supported by analogy, and is in unison with the views of some of the most original thinkers of our time.

