

ON EXCISION OF THE SUPERIOR MAXILLA. A  
STUDY OF TWO HUNDRED AND FIFTY  
CASES.<sup>1</sup>

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IN submitting to your attention this somewhat brief contribution to the surgery of the face, permit me to remark at the onset that these cases are not consecutive, except in the sense that they did not occur simultaneously, and, moreover, that those of the series with which I myself have had professional relations make up a very small portion, indeed, of the entire list. Therefore, this is not an instance of "Where more is meant than meets the ear." The object of presenting such a number of cases, gleaned from the extended literature of the subject, is to determine whether or not further practical means for the better security of life and for the prevention of disease recurrence, can be suggested in connection with this somewhat familiar operation. Deformity, death and disease-recurrence are the three most potent factors of a case that control the final action of unfortunate patients. That the cosmetic element of an operation wields a most forcible influence on the inclinations and final decisions of luckless patients, is a matter of common observation of all surgeons. If, now, to the element of resulting deformity be added the uncertainty of recovery and of disease recurrence, then, indeed, there seems to be but little to encourage the lay mind to prompt and decisive action. It is not my intention to utter new nor to echo old homilies on the tendency to procrastination that so often

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prevents prompt interference in connection with the surgical treatment of localized malignant disease. Yet, it is proper, I think, to express the belief that many lives will be saved, many prolonged, and much mental and physical suffering will be obviated, when the ill-fated who are afflicted with malignant disease are convinced early of the importance of immediate surgical intervention. It frequently happens that patients are not encouraged to prompt action by sentimental physicians and surgeons, so that their worst fears may be temporarily placated. While, perhaps, this course may be wise and humane in some instances, still, a free indulgence in it is calculated to shorten life and increase the death rate in this class of afflictions. Bad news, as a rule, ought to be imparted at once, so that those who are interested may immediately avail themselves of the steps necessary for repair of the breach. The telling of good news may be deferred, since little else may remain than to rejoice. The removal of the superior maxillæ may be properly classed with the formidable surgical operations, since the steps necessary for the removal, and the removal itself, cause a marked impression on the mental and physical tone of the patient. The resulting deformity of feature is mitigated only by the facts that disease is removed, suffering arrested, and that a new lease of comfort and life is executed.

However, let us, without further indulgence in platitudinous delay, interrogate the series of cases here presented. The result of the questionings will not include the name of the operator, the time of the operation, nor the method of its performance. In fact the meagre description of the operative methods, and often the entire absence of any allusion to them, make any deductions thus drawn of no special importance. However, your attention will be directed to the following points in the histories of these cases. (1) The nature of the disease; (2) the duration of the disease; (3) the jaw involved; (4) amount and character of the hæmorrhage; (5) the immediate and remote results of the operation; (6) the recounting of special matters in connection with individual cases.

It is proper to state at the outset that 254 cases have been analyzed instead of 250, as indicated in the title of the paper.

Of this number two only were performed by myself: Your attention will be called somewhat later to the peculiarities relating to these alone. In 230 of the 254 cases one jaw only was removed, leaving 24 in which both bones were excised simultaneously. The nature of the disease for which the operations were performed was largely of a malignant character, the exact varieties and duration of which will not be recited here, but will be found in an annexed table. One hundred and eighty-eight of the 230 cases of removal of a single jaw recovered from the effects of the operation more or less promptly. Thirty-three, or about 14% of this entire number, died more or less soon from either the immediate results of the operation or from the complications and early sequels.

Complete removals of a single jaw are found to have been followed by a death-rate five times greater than after incomplete removals. No consideration is given in this estimate of the comparative death-rate, to the influence exercised by the extent and nature of the disease, nor to the vigorous means necessary to meet the requirements of unusual cases. An examination of the tabulated statement as to duration and nature of the disease will do much toward determining the influence of these elements on the final result.

Primary hæmorrhage caused death in 9 cases, or about 4% of the entire number of single removals. Erysipelas, septicæmia and other complications claimed their share of death's harvest. In 57, or about 25%, of the 230 cases profuse hæmorrhage is reported to have taken place, coming about equally from the facial incisions and from the deeper part of the wound. The sources of this hæmorrhage were from the recognized branches of the facial and the internal maxillary arteries, as can be easily comprehended. In 13 instances, or about 5½% of the entire number, dangerous hæmorrhage is reported, of a primary and secondary nature. It may not be uninteresting to note the facts that the left jaw was involved 110 times, and the right 74 times in the 230 cases. Of the remaining 46 the histories do not indicate the side involved. However, sufficient facts have been recited to suggest the interesting and probable circumstance that the left jaw appears to be more liable to disease than the right. More deaths are

reported to have followed removal of the right than left maxilla. However, this showing can be scarcely more than coincidental, since similar diseased conditions would undoubtedly be followed by similar results, other things being equal. As before remarked, in 24 instances both upper jaws were removed simultaneously. In these cases not a death is reported to have occurred as the direct result of the operation. This is, indeed, a strange fact, especially when it is recalled that about 14% died from the immediate and consequent effects of the removal of a single jaw. A closer examination of the nature of the disease calling for operation, and of any preparatory steps incident to it, demonstrate nothing to favor the surprising result that attended cases subjected to the double removal, except that in 15 of the 24 cases the removals were incomplete. This is a manifestly important fact for consideration, when it is recalled that in the single cases, irrespective of the disease calling for the operation, the death rate was increased 500% by entire removal. This exhibit would seem to argue that it is safer to remove both than a single jaw, a manifestly irrational statement; it is likewise suggestive of the strangeness of what may be called coincidence, if not also of the questionable worth that can be attached to conclusions deduced from limited statistics. Had it fallen to the lot of any one surgeon to have been able to report such a result from his individual experience, then, indeed, he could rightly claim special skill, as well as good fortune. Profuse hæmorrhage was present in 6 only of the 24 cases, and dangerous hæmorrhage is said to have happened but once. Here, again, are noticed confirmatory facts, when this series (24) is compared with the series of single removals. In the latter profuse hæmorrhage was present in 29% of the cases, while in the former it was present in but 24%. In the cases of single extirpation dangerous hæmorrhage happened in about 5½%, while in the double series but a single case of this form of bleeding is reported. These facts are consistent with, and, indeed, are quite necessary to the brilliant results already reported in the operations of double removal. The date of the recurrence of disease after operation is reported more meagerly than any other of the items. I fancy that this omission is largely due to the fact that pa-

tients soon pass from the observation of the surgeon, and also it not infrequently happens that the operator is so much elated with the immediate results that he, too, loses sight of this, the most important practical element of the case. Before calling attention to the relation of the complications that are found associated with the varieties of the disease that demanded the operation of excision, it will be found to be interesting, I think, to place before you some facts of special character relating to individual cases of the series. This course can but serve to impress that which will be said later as bearing on the special means to be adopted to obviate as far as possible the special causes of death.

The first case is one in which, after removal of the upper jaw for osseous tumor, severe primary oozing occurred, which at the end of ten days was followed by severer secondary oozing from the depth of the wound, that nearly exhausted the patient before the bleeding was controlled, which was done by plugging with styptic compresses. In 1830 Mr. Scott, of the London Hospital, assisted by Mr. Luke, ligatured the external carotid below the digastric muscle before removing the superior maxilla of that side for osteo-sarcoma. The only oozing points were from the facial of the opposite side, as can be readily surmised.

In 1857 Mr. Bickersteth encountered profuse hæmorrhage after removal of the superior maxilla for an osseous growth. The hæmorrhage was controlled only by pressure on the common carotid followed, after much trouble, by ligature of the bleeding point, thought to be the internal maxillary. Dr. John Ashhurst, Jr., is reported to have lost a patient two hours after operation from shock and loss of blood following the removal of the superior maxilla for a fibrous tumor.

In 1829 Mr. Lizars removed the right superior maxilla for the cure of sarcoma. He ligatured the right external carotid as a preparatory step. The amount of hæmorrhage following the operation is not recorded; presumptively, however, it was small, since no allusion is made to it in the report of the case. In 1835 the same surgeon encountered a case of severe oozing lasting three days, after the removal of the upper jaw for the cure of osteo-sarcoma, which was checked finally by pressure.

Pressure on the common carotid is reported to have been necessary in the case of Liston's to control severe hæmorrhage following the removal of the jaw. Mr. Holmes Coote was obliged to ligature the common carotid to arrest severe secondary hæmorrhage, that occurred on the eighteenth day after removal of the entire upper jaw for the cure of cancer. The patient died two hours after the ligaturing, probably from the loss of blood.

In 1831 Mr. Earle tied the common carotid preparatory to removal of the right superior maxilla for a "fungoid" growth. The amount of hæmorrhage that occurred during the operation is not reported, but the subsequent course of this surgeon in respect to the treatment of the patient warrants the belief that the amount was insignificant, and possibly insufficient, since it is reported that "on the night following the operation the patient was bled to the amount of one pint." This patient recovered. It is possible that George Grabbe, who wrote in 1832, may have heard of this case and was caused by the knowledge of it to write :

Man yields to custom as he bows to fate,  
In all things ruled—mind, body and state;  
In pain, in sickness, we for cure apply  
To them we know not, and we know not why.

Mr. A. G. Field tied the common carotid to arrest secondary hæmorrhage taking place on the day following the removal of the upper jaw for an unclassified tumor. The patient recovered.

About 1830 Mr. Lizars tied the common carotid preparatory to removal of the superior maxilla for the cure of medullary sarcoma. Notwithstanding this step, it is reported that the patient lost two pounds of blood. It came from the gums and palate. The reason for this degree of bleeding is assigned to "hæmorrhagic disposition." The patient recovered, but died some months after from return of the disease.

In 1867 Dr. Frank Hamilton is reported to have ligatured the common carotid before removal of a rapidly developing fungoid growth of the maxilla. The amount of bleeding at the time of the operation was inconsiderable, still slight sec-

ondary hæmorrhage happened on the sixth day following the operation.

In 1860, W. H. Gott encountered an almost fatal hæmorrhage following the removal of the superior maxilla for the cure of fibroma. Again in 1871, he performed a similar operation for the cure of sarcoma. It is reported that but "little blood" was lost—about 8 ounces. As a further illustration of the appreciation of some operators of what constitute "a little blood," I will call your attention to the following case operated on by Mr. W. J. Leake, followed by the loss of "a little blood," "about 16 ounces," "no ligatures were required." It might be added that modern comment is unnecessary in connection with such hæmorrhagic statements. Surely, if this be the type of hæmorrhage denominated "little" or "very little", then, indeed, should

Man wants but little here below, nor wants that little long.

In 1856, Detmold tied the common carotid for the removal of the superior maxilla for cure of osteo-sarcoma. Notwithstanding this step, hæmorrhage classed as "fearful" occurred, which was stopped with cautery. In 1869, Ashhurst, Jr., is reported to have lost a patient from the effects of hæmorrhage and shock within a short time after the operation for the removal of a fibrous tumor. In 1874, W. H. Pancoast tied the common carotid to arrest secondary hæmorrhage that followed the removal of the superior maxilla for cure of medullary sarcoma. He was prevented from tying the external carotid on account of the infiltration of the tissue surrounding this vessel.

It will be seen that in the 17 special cases just cited dangerous or fatal hæmorrhages have occurred in all. Osseous tumors are credited with 2; osteo-sarcoma with 3; fibrous tumors with 3, 2 of which died as a consequence; sarcoma 3; unclassified tumors 3; fungoid 2; cancer 1. In these cases the external carotid was ligatured primarily in 3 instances, and all recovered. The common carotid was ligatured primarily 4 times, and all recovered; and for secondary hæmorrhage twice, of which 1 died. It is interesting in this connection to notice the opinion of the late Prof. S. D. Gross, bearing on the ques-

tion of ligature of the *common* carotid as a preparatory measure. "I have never found it necessary in any of my operations upon the upper or lower jaws to secure the carotid artery as a means of preventing hæmorrhage. Indeed, one can but be surprised that such a procedure should ever have been recommended, much less employed by any sensible surgeon." The full force of this remark will be considered further along.

The time that can be properly devoted to the reading of this paper will not permit the writer to defer longer the consideration of the special, immediate and remote results of the operations and the best means of obviating their ill effects. Hæmorrhage and shock will be alluded to only in connection with the immediate results, while deformity of the face and utterance and disease-recurrence will compose the items of the remote results. In connection with shock, due to the operation direct, I can offer no suggestions other than those already well known to the profession. In connection with the prevention of hæmorrhage and its consequent shock, I have no new suggestion to offer, but I have a desire to emphasize one expedient that was carried into effect by Lizars so long ago as 1830, which is preliminary ligature of the *external* carotid, especially when the nature of the growth warrants the belief that profuse or dangerous hæmorrhage will be encountered. This leads me to inquire is ligature of the external carotid a safe operation? Up to the present time this vessel has been ligatured no less than 85 times (8 of which are my own), and in no instance, so far as I am informed, has death or dangerous secondary hæmorrhage followed as the direct cause of the ligature, and in but one—my own—can death be positively ascribed to this operation alone. Since this case is of unusual interest by reason of the origin of the facial artery from the point of bifurcation of the common carotid usually occupied by the superior thyroid, for which it was mistaken at the time of the operation, I will briefly state the case.

The patient was suffering from extensive carcinoma of the lower jaw and floor of the mouth, attended with severe pain and much difficulty in swallowing and speaking. The external carotids were ligated simultaneously. The malignant growth diminished rapidly in size, the pain



ceased, and the ability to swallow and to speak was also markedly improved. On the fifth day following the operation a slough occurred on the right side of the former situation of the submaxillary gland, and extended to the diseased lower jaw. On the ninth day after the operation the patient died from the effects of a hæmorrhage from the seat of the slough.

As implied but a moment ago, the submaxillary gland had been removed some time before the ligature of the carotids, on account of involvement from the primary seat of the disease?

The removal of the gland at the time required the ligature of the facial artery *before* the giving off of the branches that are distributed to the tissues contiguous to it, and for this reason on the tissues about the stump of the remaining—the cervical—portion of the vessel depended on other sources than the right facial for their nutrition, and the same can also be said of the extreme end of the arterial stump itself.

In my observations no instance of a similar abnormality of the facial has occurred, nor does anatomical literature, so far as I have been able to ascertain, present a parallel instance.

Surely, such a record as this regarding the ligature of the external carotid, cannot be gainsaid as to safety. In one of the two cases of my own in which the entire superior maxilla and malar bone were removed but a few weeks since for carcinoma involving the entire bone, the external carotid was tied as a preliminary measure. This patient, æt. 69 years, and the growth was very prominent, and extremely vascular. The total amount of hæmorrhage was trifling, coming only from the opposite facial and the anterior palatine branches of the opposite internal maxillary. At the termination of the entire operation, which lasted scarcely an hour, the pulse of the patient was but 74, and a rapid recovery from the operation itself ensued. As to the propriety of ligating the common carotid for the purpose of preventing primary or secondary hæmorrhage in these operations, the results of ligature of this vessel for removal of the jaw will be briefly cited. Dr. Wyeth has reported 38 cases in which the common carotid was ligatured preparatory to or after removal of the superior and inferior maxillæ.

Of this number about nine or about 24% died. When it is noted that the death-rate in 230 cases of removal of the superior maxilla is 12% only, then, indeed, should the preparatory ligature of the *common* carotid for the purpose of this removal be condemned, as it appears that it doubles the death-rate following removal of these bones. These comparative results emphasize most forcibly the wise remarks of Dr. S. D. Gross quoted but a few moments ago regarding the tying of the carotid in those operations.

The deformity of face and of utterance require but a moment's consideration. As soon as the healing is completed, and even before if the disease be not malignant, the services of a dentist should be employed. The introduction of a vulcanized rubber, "plumper" combined with an obturator will be sufficient to almost entirely remedy these defects. The question of disease-recurrence is indeed most important to the patient. It is for the eradication of disease that the unequal fight is made, for as Johnson wrote "where there is no hope there can be no endeavor." As bearing on this part of the subject, I can make but one suggestion, which is as to the influence on disease-recurrence of ligature of the vessels nourishing the region from which it springs. While I do not believe that this step will do much, if anything, toward the prevention of the recurrence, still I do believe that it may defer the event and lessen the rapidity of the growth. If such be the case, then ligature of one or of both *external* carotids, may be said to meet two important practical indications in malignant disease of the regions supplied by these vessels. This brings me to the consideration of the second and last of my own cases which I will submit to you for what it is worth, leaving you to judge whether or not its employment may not at least yield additional hope:

W. B., æt. 22 years, single, printer; family and personal histories good. In 1884 B. noticed the usual symptoms indicative of the existence of a polypoid obstruction of the left nostril. In 1885 the actual existence of such a growth was demonstrated by a medical gentleman, who soon after removed a portion of it with forceps. From this time until 1888 portions of the growth were removed at varying intervals

with forceps and snare; and during this time, too, the extent of the attachment and the nature of the growth were frequently determined. It was a myxo-sarcoma, as determined by microscopical examination. It was attached to the basilar process of the occipital bone, to the posterior and left wall of the pharynx, also to the palate bone and the internal pterygoid plate of the sphenoid bone. In November, 1886, a spontaneous and very severe hæmorrhage occurred from the tumor.

At this time the growth was increasing in size rapidly. A little later a second and severer hæmorrhage occurred; this, too, was spontaneous, and was checked only after the anterior nares and the pharynx were tamponed. In fact, the patient was nearly exsanguinated by this loss of blood. In February, 1888, a third attack occurred at night, which was arrested in the same manner as the preceding. This attack confined the patient in bed for eight days.

On May 5, 1888, the patient suffered more severely than usual from pressure symptoms referable to the hard and soft palate, and also to the supramaxillary and auriculo temporal branches of the fifth pair of nerves. For months before this time, and with increasing severity, pain had existed in the pharynx. At this time the patient could not breathe through the nostrils. The tumor filled the upper part of the pharynx so completely that the index finger could be introduced only with difficulty between it and the right side of the wall of the cavity, and the act was often followed by quite severe temporary hæmorrhage. The pressure of the growth on the hard and soft palate caused a well-marked inferior convexity of these structures, especially of the latter. A small bony spiculum was seen protruding from the inferior surface of the soft palate at the junction of this structure with the hard palate. Anodynes were required at this time to quiet the patient, and often to insure sleep on account of pain and nervous irritation. The appetite decreased; marked and increasing emaciation was apparent. The patient now refused further attempts with the snare and begged for a radical operation—which had been promised him—irrespective of the outcome.

Therefore, on June 19, 1888, the external carotids were ligated simultaneously in the presence of many of the house staff of Bellevue Hospital. The wounds healed by primary union. At the end of a week all pain had ceased and the size of the tumor had diminished to such a degree that not only had the previous bulging of the palate caused by it disappeared, but the index finger could easily explore the dimensions and determine again the attachments of the growth. And, too, these examinations were followed by slight oozing only, barely

sufficient to discolor the finger. On June 28, the left superior maxilla was removed below the orbital plate, thus exposing freely the left side of the tumor; and, although the bone was removed nine days after the ligating of the external carotids, but one arterial spurt of sufficient size to require ligature occurred during the entire procedure, and this was at the situation of the anastomosis of the facial and ophthalmic arteries.

The final step, the removal of the tumor at once, was not done, nor can I now say that I regret the omission, in view of the subsequent developments. The reasons for the non-removal were entirely politic, and foreign to any contingency that was apprehended from the attempt.

The snare was employed again, and also strong injections of carbolic acid. The latter removed portions of the structure of the growth quite rapidly by a process of inoffensive sloughing and disintegration. Finally the injection caused such severe pain that the use of it was discontinued. The patient suffers no inconvenience and no pain whatever from the tumor; and when last seen, two weeks since, it was much smaller and harder than three months before, and handling caused no pain or bleeding.

I intend to watch the retrogression of the growth as long as it may continue, but if any increase of the present dimensions occurs, or if annoying symptoms again arise, it will be removed at once.

It is not my intention to enter into direct or indirect theorizing as to whether or not the circulation of a growth, malignant or otherwise, has to do directly with the development of that growth.

In this case the effects on the pharyngeal tumor that followed ligature of the external carotids were due either to coincidence or to modification of the circulation in the growth. The fact that a rapid diminution of the size and painfulness of the tumor followed ligature is indisputable, and seems to me to remove these results from the realm of coincidence entirely. The fact that the regions occupied by the growth are supplied principally by branches of the external carotids is too well established to entitle it to the dignity of defense. The fact that the lessening of the arterial supply of a vascular growth will diminish, temporarily at least, its size, and consequently the pain due to pressure from it, must also be admitted. As to

the causes for the continued decrease in the size of the growth, I am uncertain. Surely, the establishment of collateral circulation should have long ere this supplied it with a liberal allowance of blood, irrespective of its inherent demand for this fluid. If the cell activity, from malignancy or another reason, had been greater at the onset, the effects of the ligation on it would have been, no doubt, exceedingly transient. It is possible that the use of the carbolic-acid injection and the snare since the ligation has led to continued retrogression of the tumor. However, the snaring had no such effect *before* the ligation, and it is therefore unfair to attribute it to snaring *after* ligation. The early and somewhat liberal use of carbolic acid injections *may* have caused condensation of the tissues of the growth, modified the nature of it, or otherwise discouraged the development; or is the change due to coincidence entirely?

In closing, I submit the following conclusions to your consideration:

1. That excision of the superior maxilla is not a dangerous operation.
2. That, contrary to general belief, excision of both superior maxillæ is not a specially dangerous procedure.
3. That, while dangerous hæmorrhage is not frequent in this operation, still its effects are to be feared more than other result of the operation itself.
4. That removal of the upper jaw for the cure of bony and fibrous tumors, and the removal of naso-pharyngeal polypi is attended frequently with dangerous and fatal hæmorrhage.
5. That ligation of one or both *external* carotids is a safe and commendable procedure when dangerous hæmorrhage is apprehended as the result of operations on the area of their distribution.
6. That ligation of one or both of these arteries may delay the return, and hinder the progress of a morbid growth, if it be developing in tissues supplied with blood by those vessels.
7. That—all things being equal—ligature of the *common* carotid for the purpose of controlling the circulation of the external is unwise, unsurgical and unwarrantable.

8. That complete removals are five times as fatal as incomplete removals of single superior maxilla, irrespective of the nature of the disease and of the side removed.

I append a tabulated synopsis of the 254 cases of excision of the upper jaw referred to in the preceding remarks. In the collection of these statistics, I desire to acknowledge the aid of Dr. G. C. Arnold and Dr. J. F. Erdmann.

## SYNOPSIS OF 254 CASES OF EXCISION

## EXCISION OF SINGLE JAWS.

THE UPPER JAW.

Nature of disease.	No. of cases.	Duration.	Jaw involved.			Operation.			Character of hemorrhage.				Results immediate and Remote.		Jaw involved in fatal cases.				Prim. hem.
			Right	Left	Not stated	Complete	Incomplete	Not stated	Profuse	Slight	Dangerous	Not stated	Recovery	Not stated	Died	Right	Left	Not stated	
Carcinoma, encephaloid...	14	3 months to 25 years...	5	7	2	12	1	1	2	1	1	11	13		1		1		
Carcinoma, simple.....	18	3 months to 20 years...	7	7	4	15	3		3	13	1	1	14	1	3		1	2	
Caries.....	1	Several months.....	1				1		1				1						
Cystic disease.....	1	Not stated.....	1					1				1	1						
Enchondroma.....	2	4½ years.....	2			1		1		1		1	1		1	1			
Epithelioma.....	15	2 months to 5 years...	3	7	5	12	3		5	2		8	10	1	4	2	1	1	
Exostosis.....	3	1½ to 14 years.....	2	1		2	1					3	2		1			1	
Fibroma.....	18	3 months to 25 years...	8	6	4	9	8	1	4	5	3	6	13		5	2	2	1	
Fibro-cartilaginous.....	2	1 to 11 years.....	2			1	1		2				2						
Fibro-cellular.....	2	4 years.....	1	1		2				1		1	2						
Fibro-nuclear.....	1	18 months.....	1			1							1						
Fibro-vascular.....	4	2½ years.....	4			3	1		4				3		1		1		
Fungoid disease.....	10	2 months to 12 years...	2	5	3	8	2		2	5	1	2	7	1	2		2		
Malignant disease.....	6	1 months to 2 years...	1	2	3	5	1			6			4	1	1			1	
Myxoma.....	2	11 weeks to 3 years...	2			1	1			1		1	2						
Osteoma.....	9	3 months to 14 years...	2	6	1	6	3		3			6	7	1	1			1	
Osteo-malacia.....	1	Not stated.....	1			1						1	1						
Polypus, nasal.....	6	1 to 2 years.....	2	4		5	1		3	3			6						
Polypus, naso-pharyngeal..	14	3 months to 12 years...	3	11		11	2	1	5	4	4	1	11		3	1	2		
Sarcoma, albuminous.....	1	10 months.....	1			1				1					1		1		
Sarcoma, medullary.....	6	2 months to many yrs.	2	2		6			1	1		4	4	1	1	1			
Sarcoma, myeloid.....	20	2 months to 27 years...	2	13	3	16	4		13			7	19		1	1			
Sarcoma, myxo.....	1	3½ months.....			1	1				1			1						
Sarcoma, osteo.....	20	3 months to 12 years...	8	9	3	19	1			15	1	4	16	1	3	2		1	
Sarcoma, spindle-celled...	12	6 months to 13 years...	3	5	4	9	2	1	5	4		3	11	1					
Sarcoma, unclassified.....	12	2 months to 18 years...	7	3	2	11	1		5	1	1	5	10	1	1			1	
Tumors, unclassified.....	29	13 weeks to 17 years...	12	10	7	27	2		9	10		10	26		3	3			
Total.....	250		74	110	46	183	41	6	66	75	13	76	188	9	33	13	11	9	

## EXCISION OF BOTH JAWS.—BOTH JAWS INVOLVED.

\* The 9 primary fatal cases in

Adenoma.....	1	6 months.....				1						1	1						
Carcinoma.....	2	1 to 2 years.....				2				2			2						
Enchondroma.....	1	9 years.....				1			1				1						
Enchondroma, fibro.....	2	1 to 2 years.....				1	1		1			1	2						
Epithelioma.....	2	5 months to 1 year....				2				1		1	1	1					
Erectile.....	1	Several years.....				1						1	1						
Fibroma.....	2	8 to 10 years.....				2				1	1		2						
Necrosis.....	1	Not stated.....				1			1				1						
Osteo-fibroma.....	1	18 months.....				1				1			1						
Osteoma.....	1	1 year.....				1						1	1						
Sarcoma, albuminous.....	1	3 or 4 years.....				1			1				1						
Sarcoma, medullary.....	2	1½ to 3½ years.....				1	1		1	1			2						
Sarcoma, myeloid.....	2	6 months to 2 years...				2				2			2						
Sarcoma, osteo.....	2	6 weeks to 2 years.....				1	1			1		1	2						
Tumors, unclassified.....	3	1 to 1½ years.....				3				3			3						
Total.....	24					9	15		6	11	1	6	23	1					