Original Articles.**CANCER IN AND ABOUT THE MOUTH.*****THE IMPORTANCE OF EARLY DIAGNOSIS OF CANCER IN AND ABOUT THE MOUTH.**

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EARLY cancerous lesions of the mouth may be divided into two classes: first, those which, benign in themselves, are liable to result by degeneration in carcinoma, and second, those in which the clinical characteristics of carcinoma are already evident. Of the first class are leucoplakia, warts, ulceration, fissures and tubercles. In the second, besides the malignant characteristics above stated, we find induration at the base of the lesion with ulceration, sometimes accompanied by a foul discharge.

We cannot dismiss from our calculation the benign forms, since at any time they may manifest malignant characteristics. We cannot always treat a benign lesion as malignant because it may require an extensive operation, which the danger caused by its presence does not always justify. We must therefore decide in which cases we should operate on the benign growth at once, and in what others we must be content to watch for symptoms of degeneration.

The form of malignant lesion of the mouth which has the longest period of incubation, if one may use that expression, is leucoplakia, a disease manifested by white patches in the mucous membrane. These patches, which are smooth, white and glistening, resemble, and indeed microscopically are, scar tissue. They may occur on the tongue, on the inside of the lips, on the gums and perhaps on the palate. They frequently appear in the region where an irritation occurs, as, for instance, where a tooth rubs against the tongue, or the mouth-piece of a pipe touches the buccal membrane. Constitutionally, patches of leucoplakia are often due to syphilis, although not necessarily so. In smokers who are also syphilitics they seem to be most common. Patches of leucoplakia frequently degenerate into epithelioma after a variable time. We have had cases at the Massachusetts General Hospital in which a period of twenty years has elapsed between the appearance of the patches and their eventuation in carcinoma.

Leucoplakia may appear in single or multiple form and is not characterized by an indurated base or by ulceration. When carcinoma supervenes, an ulceration appears on the border of the patch of leucoplakia and microscopical examination shows the formation of carcinoma about the ulceration. I would not be understood to mean that ulceration close to such a patch is diagnostic of the presence of carcinoma, for benign ulcerations are also observed. Yet an ulceration near a patch of leucoplakia justifies, in my opinion, a microscopical examination, whether induration of the base be present or not.

*The following papers on "The Results of the Treatment of Cancer in and about the Mouth," were read at a meeting of the Section for Surgery, Suffolk District Branch of The Massachusetts Medical Society, Feb. 1, 1905.

To be classed among malignant lesions other than leucoplakia is also simple ulceration. This may occur on all portions of the mouth, tongue and soft palate. It is usually caused either by local irritation, as a bad tooth, or some irritation, such as a pipe, or by diseases, such as syphilis, tuberculosis or lupus. Practically lupus and tuberculosis can be diagnosed by the wide, shallow appearance of the ulcer with its undermined, irregular edges and its lack of induration. The general condition of the patient and failure to find elsewhere evidences of the disease are also points to be noted. Ulcerations from tuberculosis and lupus are far less frequent than those of syphilis or even those of traumatic origin. Practically, syphilis and trauma (the latter name including all forms of local irritation) form the main classes with which we have to deal.

In excluding syphilis we must remember that, as ulcers are caused by the tertiary form, we should look for all evidences of this stage of the disease. Tertiary ulcerations may occur at any point in the mouth or on the tongue, but especially upon the soft palate. They may be multiple and associated with other syphilitic lesions in the mouth or nose. By careful examination we can often find the scars of earlier lesions on tongue, palate or posterior wall. The nostrils should be minutely examined for past or present necrosis of the septum or turbinates. Perforation of the bony septum, even where it causes no external deformity whatever, is often found, and when present is almost absolute evidence of pre-existing syphilis. No practical, valuable rule can be given in the diagnosis of the ulcer itself except the stony feel of the induration. It is well known that the history is not of value in such cases. Treatment by syphilitic medication is of course a sure test but is time consuming, and the feeling at present is that no delay in the removal of the carcinoma is permissible. Nevertheless, when the diagnosis is doubtful and it can be made in no other way, the writer believes that anti-syphilitic treatment should be tried. Not longer than a week, using large doses of iodide, is necessary to establish a diagnosis, and a favorable improvement may sometimes be noticed in less time.

It may be remarked here, as a further aid to diagnosis between carcinomatous and syphilitic lesions, that the former are far more apt to be found in the middle third of the tongue than elsewhere; whereas the specific lesions have no special localization.

Traumatic ulcerations may, under careful examination, almost always be associated with their causes. A sharp tooth near the site of ulceration, in a position such that the tongue in its movements may rub against it, is the most common of these, and such ulcerations usually heal with rapidity as soon as the cause is removed.

Finally, given an ulceration the character of which inclines us strongly to the belief that it is carcinomatous, the question arises as to the mode of procedure. If there is no room for reasonable doubt, the patient should be at once operated

upon radically, a small wedge being removed at the time of operation and examined by a competent pathologist before proceeding further with the operation. If, on the other hand, any reasonable doubt exists as to the nature of the growth, the same procedure — namely, excision of a small wedge-shaped piece, — may be practiced under cocaine, taking care to cut wide of the lesion into healthy tissue, both to avoid any danger of starting metastases by the incision and also to afford the pathologist a comparison between the healthy and diseased tissue. The edges of the wound are brought together by suture and unite very quickly. No time should be lost in examination of the piece so removed, and if malignant radical operation should follow as soon as possible. Most important of all is it that the practitioner should follow up suspicious cases until no doubt remains in his mind in regard to the nature of the growth. Patients constantly present themselves to the clinics with advanced carcinoma, neither they nor their physicians having regarded the earlier symptoms as of importance.

THE RESULTS IN CASES OF CANCER OF THE TONSILS, TONGUE, AND JAWS, OPERATED ON AT THE MASSACHUSETTS GENERAL HOSPITAL DURING THE EIGHT YEARS FROM JANUARY 1, 1892, TO JANUARY 1, 1900.

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THIS series is comprised of ninety-two consecutive cases of cancer involving the mouth that were observed at the Massachusetts General Hospital during the eight years from Jan. 1, 1892, to Jan. 1, 1900. They have been divided for convenience into four classes: (1) Cancer of the tongue, or floor of the mouth involving the tongue. (2) Cancer of the tonsil, which includes two cases of cancer arising from the mucous membrane of the cheek, but involving the fauces at the time of observation. (3) Cancer of the upper jaw, including those arising from the antrum, alveolar process, or hard palate; and (4) cancer of the lower jaw, arising either from the mucous membrane over the alveolar process or more deeply placed, having a glandular origin, but soon involving the bone. Not all were operated upon; some being too far advanced at the time of consultation, while others refused operation on being told the probable result. In many, also, operation was undertaken only as a last resort in the hope of relieving symptoms. Eighty-three cases have been followed, while no information as to the result could be obtained in nine. Both operated and unoperated cases were followed to enable conclusions to be drawn in comparing the two classes.

The results obtained have been very interesting and have occasioned considerable surprise, completely upsetting the preconceived idea that cancer of the mouth was a hopeless disease, and

that if the patient survived the operation he would surely die in a short time from recurrence.

The information sought from the cases was whether there were any cures, whether life was prolonged and made more bearable by operation, the relative value of the palliative and radical operation, and the operative mortality. The statistics seem to be fair, but there is a possibility of several of the cases not heard from being alive, as the patients represent the floating population, and are hard to locate when alive, but are easily found in the state records if dead.

The males were much more frequently affected than the females, as was to be expected, the actual numbers being 71 males and 21 females. Many of the histories, unfortunately, were too vague to allow any conclusions as to the predisposing cause to be drawn. Almost all used alcohol and tobacco and many dated the first symptom from trouble with the teeth, but as in this class of patient bad teeth are the rule, too much stress should not be laid on this point.

The average age was fifty-four and one third years. Taken by decades that from fifty to sixty years gave the largest number of cases, sixty to seventy years came next, with the decade from forty to fifty, third. The extremes in age were seventy-four years and twenty-one years, the latter being the youngest case found in a superficial examination of the literature. The operation consisted of everything from a simple curetting, or excision of the tumor, to a complete removal of the tongue, or jaw, with an elaborate dissection of the triangles of the neck. Six cases died soon after operation, giving an operative mortality of 10%. One of these cases, however, died of general purulent peritonitis, as proved by autopsy, which was in no way brought about by the operation. Excluding this case there was a mortality of 8½%, five cases, which, considering the age of the patients and the usual severity of the operation, does not seem excessive. One case died of shock, one of delirium tremens, and three of sepsis. It is interesting to note that there was not a single death from pneumonia, a complication so often feared and upon which so much stress is laid. There have been eight cases of cures following operation, all of which are alive and well to-day, the time from the date of operation varying from four to thirteen years. A ninth case, which should be regarded as a cure, lived four years after operation and then returned to the hospital with a sarcoma from which he died four months later. In all cases of cures there is a pathological report with microscopic examination made by Dr. W. F. Whitney. (These cases will be reported more in detail in their proper classes.)

Nearly all the cases where pathological examination was made, showed, on microscopic examination, squamous cell carcinoma, there being one case each of adeno-carcinoma, alveolar carcinoma, and carcinoma arising from an aberrant fragment of the thyroid gland at the foramen cecum of the tongue.

On the whole, life in the operated cases was

longer than in those where no operation was performed, thirty-three of the former living over one year from the first appearance of symptoms to nineteen of the latter. The figures of cases living over a year from the time of observation are more striking, being 23 against 5. Of course some were too far advanced at the time of admission and were refused as inoperable, but the greater number of unoperated cases refused operation when its severity and the small hope of ultimate cure were explained to them.

Regarded individually, the most interesting series of cases, and the only one large enough to justify conclusions, is, that of cancers of the tongue: Of these there were 54 cases, of which 34 were operated upon with an immediate mortality of 84%.

In all of these cases where a pathological examination was made the diagnosis was squamous cell cancer, with the exception of one of malignant aberrant thyroid. There was only one case of leucoplakia which presented a small ulcerated nodule near the base of the tongue, thought probably malignant. The patient refused operation and died of cancer of the tongue eight years later. Although leucoplakia is often given as a predisposing cause, this is the only case of which the records make any mention. Two forms of cancer of the tongue are recognized, one where the growth starts from the epidermis and is first seen as a small ulcer, and the second where it starts from the mucous glands and is present at an early stage as a small hard nodule ulcerating later, but at one time having a distinct nodular phase. It was impossible, however, to differentiate these two varieties from the involved stories told by the patients. The average age was between fifty and sixty years, and the males more frequently affected, as naturally would be expected. The operations consisted of everything from the simple excision of a V-shaped piece of the tongue, including the growth, to the removal of the entire organ and dissection of the triangles of the neck. Strange as it may seem, there were more cures following comparatively simple operations than the more radical ones, but this is probably explained by the age of the patients. This point will be touched upon later in the paper. Owing to the large number of lymphatics in the tongue, infection of the lymph nodes undoubtedly occurs early, and it is said that recurrence is in the cervical lymph nodes rather than locally. In this series of cases, however, the reverse has been true, more recurring locally than in the glands.

Of the 34 operated cases, 4 are alive and well to-day; 2 thirteen years after operation, 1 six years after operation, and 1 four years after operation. A fifth case lived four and a half years and then died of sarcoma. Including this as a cure of the original carcinoma, the percentage of cures is 14.3%. That life was prolonged by operation is undoubted, as shown by the figures on the chart, being eleven months longer from the first symptoms and fourteen and seven tenths months from the time of observation. The cures all

occurred in old cases, the patients being seventy, seventy-four, sixty-two and sixty-two respectively. The fifth case, on the other hand, was an exception to this, being extremely young, but twenty-one years old. The detailed history of these cases is as follows:

CASE I: Dr. J. C. Warren. — Female, seventy years of age. Entered hospital Nov. 14, 1892. Two years before entrance a lump on the right side of the tongue was removed under cocaine by her physician. Some was left, however, which for eight months had been increasing rapidly in size. Examination showed the whole right side of the tongue, from the fauces to the tip, occupied by a large, hard, sloughing tumor which in places crossed the median line. No glands could be felt in the neck. The tongue was drawn out through the mouth with silk sutures passed through its body and the anterior three quarters amputated by a V-shaped incision. The wound was closed with silk. The patient made a good recovery and was discharged well. In January, 1901, she returned and a nodule the size of a walnut, which had appeared on the stump of the tongue, was removed by Dr. Warren by a simple operation. Microscopic examination of both specimens showed epidermoid cancer. The patient is still alive and well, thirteen years after the first operation, and shows no sign of recurrence. The patient is now eighty-three years old, she talks very indistinctly, but has apparently little difficulty in taking food.

CASE II: Dr. J. C. Warren. — Male, seventy-four years of age. Entered hospital Dec. 14, 1892. One year before entrance, patient noticed a small lump under the tip of his tongue which slowly increased in size but caused no pain and but little inconvenience. Examination showed an indurated ulcerating tumor the size of a robin's egg under the tip of the tongue. No glands could be felt in the neck. At operation an incision was made under the symphysis and carried up through the floor of the mouth. The tongue was then drawn through the incision and its anterior half, including the tumor and the surrounding tissue, removed by a V-shaped incision. The wound in the mouth was closed with silk and the skin with silkworm gut. The patient made a good recovery and was discharged in a short time well. The patient was heard from in January, 1905, thirteen years after operation. He is in perfect health, but rather feeble. He is eighty-seven years old.

CASE III: Dr. A. T. Cabot. — Male, sixty-two years of age. Entered hospital Feb. 25, 1899. Seven months previous patient had noticed a small lump on the left side of the tongue which had caused him no pain or inconvenience. On examination there was found a nodule on the left side of the tongue about one inch from the tip, which was about the size of a filbert, hard but not ulcerated. Several small, hard glands could be felt on the left side of the neck and under the angle of the jaw. At operation an incision was first made under the jaw and the lingual artery tied, the tongue was then drawn out through the mouth, split down the middle and the left half removed. The edges of the mucous membrane were approximated with catgut and the skin wound under the jaw closed with silkworm gut. No attempt was made to remove the glands. Microscopic examination of the specimen showed epidermoid cancer. The patient made a good recovery and was discharged well. In response to a letter he reported to the hospital on Jan. 20, 1905, almost six years after operation, in perfect health. He spoke distinctly and had no trouble in eating; there was no sign of recurrence.

CASE IV: Dr. M. H. Richardson. — Male, sixty-two

years of age. Entered hospital January, 1897. One year before the patient had noticed a sore on the side of his tongue which diminished in size when he stopped smoking, but for two months previous to entrance to the hospital grew rapidly. Examination showed a hard, indurated growth occupying all the left side of the tongue from the fauces to the tip, foul and sloughing. There were many large lymph nodes in the left side of the neck. At operation an incision was made under the lower jaw on the left and carried into the mouth, after first tying the lingual artery. The tongue was then drawn out through the incision and amputated at a level with the circumvallate papillæ on the left and half an inch farther forward on the right. Thorough dissection of the glands in the neck was made and the skin wounds closed with silkworm gut; the mucous membrane of the mouth being approximated with catgut. The pathological examination of the specimen showed it to be epidermoid cancer. The patient was discharged well after a rapid recovery and was examined in 1901, four years later, by Dr. Richardson, at which time he was found to be in perfect health with no sign of recurrence.

CASE V: Dr. F. B. Harrington. — Male, twenty-one years of age. Entered hospital Sept. 15, 1893. Four weeks previous the patient had noticed a small lump under the tip of the tongue on the right side. On examination an ulcer the size of a ten-cent piece was found in that position over a small indurated area. At operation a triangular piece of tongue, including the growth, was removed through the mouth and the cut edges of the tongue approximated with silk sutures. Microscopic examination of the specimen showed typical epidermoid cancer. The patient remained perfectly well for four years, but returned to the hospital in October, 1897, with a lump the size of a walnut under the angle of the jaw on the right, involving the base of the tongue. At operation a complete excision of the tongue was done by Kocher's method. The microscopic examination of this specimen showed small, round-cell sarcoma. The patient made a good recovery and was discharged well but died four months later of recurrence.

Of cancers involving the tonsils there were eight cases, in only two of which was an attempt made to remove the whole growth. All these cases have been traced and are dead, but the number is so small that it does not seem justifiable to draw conclusions from them alone, although they are included in the table, embodying all the cases.

There were 15 cases of cancer of the upper jaw, on 11 of which operations were performed without mortality. Most of these cases arose either from the antrum or the alveolar process of the jaw, six each, only one originating on the hard palate. Fourteen of these cases have been followed and all but two are dead, the average length of life being in the operated cases 38.75 months. But two of the nine operated cases followed died within a year, one lived three years, two lived four and a half years and one is alive and well to-day. His history is as follows:

Dr. J. W. Elliott. — Male, sixty-six years of age. Entered hospital in June, 1897. For eight weeks previous to his entrance he had noticed some swelling of his left cheek associated with shooting pains. Examination showed a tumor of the left upper jaw presumably arising from the antrum, which caused considerable bulging downwards of the hard palate and extended upwards to the floor of the orbit, and was

seen externally as a swelling of the cheek. At operation a complete excision of the upper jaw was done, the specimen on microscopic examination showing alveolar carcinoma. The patient made a good recovery and is alive and well to-day, eight years later. He is actively engaged in his trade, that of a blacksmith.

One other case of partial excision is alive and well to-day, six years after operation, that of a man with a fungating ulcer of the cheek involving the bone, this case probably started, however, as a rodent ulcer.

Of cancer of the lower jaw there were 15 cases during this period of seven years, on 12 of which operation was performed, which in nearly all was complete and radical. There were two deaths following operation, giving a mortality of 16½%.

All the cases were followed and all but two are dead, no other cases operated upon living over one year. One case, however, deemed too far advanced for operation, lived two and one-half years. The two cures were in the two most favorable cases. One was a fungating ulcer on the gum, which was removed with a large portion of the alveolar process, a comparatively minor operation. The growth on examination proved to be malignant papilloma. The patient is alive and well to-day, eight years after operation.

The other case was a woman forty-five years of age who presented an ulcerating tumor on the alveolar process the size of an almond. At operation the growth with a portion of the alveolar process was removed and on pathological examination proved to be a squamous cell carcinoma. The jaw was not resected and no attempt was made to remove the glands from the neck. The patient is alive and well to-day, six years after operation.

This series of cases shows that although in malignant disease around the mouth the prognosis is very grave, a certain percentage of patients are cured by operation. Age seems to be a very important factor, the malignancy of the disease diminishing as age increases, the two longest cures, thirteen years, occurring in old people, seventy and seventy-four years respectively, at the time of operation.

The relief of symptoms following operation could not be determined; but in many cases where it was possible to communicate with friends there was alleviation of symptoms, varying in length of time, in all but one case.

Cancer of the tonsil is the least favorable to operation. This is to be expected as its anatomical relation is such that it is practically impossible to remove it with a good margin of healthy tissue, if it is involved in a malignant growth.

Next to cancer of the tonsil that of the lower jaw seems to be the most malignant, returning soon after a radical operation and causing death within a year.

Life, in cancers of the upper jaw, seems to be prolonged more than in any other type of disease involving the mouth, although the hope of ultimate cure is no greater. If one called cases

living three years without a recurrence cured, there would be in this series five cases, or 50%, but three of these cases died after this length of time of recurrence, two even surviving four and a half years after operation, but eventually succumbing to the disease.

In cancer of the tongue, life certainly was considerably prolonged and there was a much larger percentage of cures than is generally supposed. These cures, however, bore no relation to the size of the growth or the extent of the operation. In but one of the cures was a radical operation done. In two the disease was apparently too far advanced to offer any chance of cure, half of the tongue being involved from the tip to the pillars of the fauces, but these people were of advanced age, a time when the malignancy of cancer is somewhat diminished. It must not be inferred from this, however, that the simple minor operation is advocated in this disease, and it is probable that had as extensive operation been done in all cases the percentage of cures would have been larger. The writers believe that all operations for cancer should be as radical as possible. Thus Butlin in 199 cases, where a radical operation was done, reports 20% of cures; and Laison, cited by Von Bergmann, 34%. This operation as done in Germany, however, is very extensive, the operative mortality varying up to 25%. Both the above observers fail to state whether their cases were selected or represented a consecutive series.

ALL CASES.			
Number,			92
Followed,			83
Males,	71	Female,	21
Average Age,			54½ yrs.
Age by decades:			
20-30	5	50-60	27
30-40	4	60-70	25
40-50	20	70-80	12

OPERATED CASES.	
Total,	62
Followed,	57
Operative mortality (5 cases),	8.5%
Cures (9 cases),	16.3%
Duration life from first symptom,	29.3 mos.
Duration of life from operation,	23.7 mos.

UNOPERATED CASES.	
Duration life from first symptom,	19.8 mos.
Duration life from observation,	9.3 mos.

CANCER OF THE TONGUE.			
Number,			54
Followed,			46
Males,	45	Female,	9
Average age,			53½ yrs.
Age by decades:			
20-30	4	50-60	14
30-40	3	60-70	13
40-50	12	70-80	9

OPERATED CASES.	
Total,	34
Followed,	30
Operative mortality (3 cases),	8.8
Cures (5 cases),	16.7
Duration life from first symptom,	32 mos.
Duration life from operation,	26.8 mos.

UNOPERATED CASES.	
Duration life from first symptom,	20.9 mos.
Duration life from observation,	12.1 mos.

SARCOMA.

In following up the foregoing cases the results of some of the sarcomas were also inquired into, and although the series of cases is not as complete, it seems worthy of mention for the sake of comparison. The results on the whole were somewhat better than in carcinoma, but on analyzing the cases it was found, as would naturally be expected, that the less malignant types, such as the giant cell, fibro-myxo- and osteo-sarcoma recovered, while the round- and spindle-cell variety almost invariably died.

Ten cases of epulis, giant-cell sarcoma, have been followed, all of which are alive and well, more than five years from the date of operation. Two cases returned after operation, but in both of these the growth only was removed, while in the others a portion of the alveolar process was taken out with it. The two recurrences were operated upon again and are now cured.

Of the five cases of sarcoma of the tonsil followed four were operated upon. Two of these, both of the small, round-cell type, lived five and six years from the time of operation before succumbing to the disease. The third, also a small, round-cell sarcoma, died of recurrence in two months. The fourth case, an extensive large round-cell sarcoma, in which the operation was only undertaken for the relief of symptoms, took arsenic internally and is alive and well to-day, thirteen years after operation.

Of the sarcomas of the upper jaw five operated cases were followed and two are alive, one a fibro-sarcoma, six years after operation. The other, a case of sarcoma hard to classify, but of an endothelial type, is alive five years after the first operation, but has had several recurrences, and in fact has one at the present writing.

Three of the seven cases of the lower jaw followed are alive, an osteo, a fibro-osteo, and a lymph-angio sarcoma. The other four cases were of a more malignant type and are dead.

THE RESULTS OF TREATMENT OF CANCER IN AND ABOUT THE MOUTH AT THE BOSTON CITY HOSPITAL.

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THE cases upon which this report is based are taken from the records of the Boston City Hospital during the nine years from Jan. 1, 1895, to Dec. 31, 1903, inclusive. In this period, records are found of 69 cases, an average of about 8 each year. Of the total of 69, we have been able through various means to secure fairly reliable information regarding 60, or nearly 87%.

It has seemed undesirable from the view point of simplicity to attempt to define too explicitly for classification purposes, the unusual and relatively infrequent sites of carcinoma in and about the mouth. We have, therefore, grouped

all the cases under four headings: namely, *tongue*, *inferior maxilla*, *superior maxilla*, and *tonsil and fauces*.

Carcinoma of the tongue we found to occur in 30 cases (43.47%); inferior maxilla in 22 (31.88%); superior maxilla in 9 (13.04%); and tonsil and fauces in 8 (11.59%).

On the age basis, we have, as would be expected, the majority occurring in the period from forty to seventy years: to be more exact, thirty to forty years, 7 cases; forty to fifty years, 17 cases; fifty to sixty years, 25 cases; sixty to seventy years, 15 cases; seventy to eighty years, 5 cases.

Sexually considered, 56 were males and 13 were females, slightly over four to one.

Of the total number of 60 which were traced, 17 were either considered inoperable or else refused operation, leaving 43 on whom operation was performed.

Taking the cases as a whole, a general average regarding duration of symptoms, before application was made for treatment, is shown to be about seven months. This fact must not be lost sight of when later we come to speak in detail of the results and the causes of failure, the patients in most cases not having been seen until the disease was well established.

Touching briefly on the pronounced symptom or symptoms associated with each of the four parts involved, we find that when the tongue or inferior maxilla was the site of the disease, local pain and dysphagia were most complained of; in the case of the superior maxilla, pain, dysphagia, excessive salivation, and what we choose to call the trismus of malignant disease, whereby, because of the involvement by extension of the muscles of mastication, or the invasion of the temporo-maxillary joint, movement of the jaws becomes markedly limited or wholly prevented; where the tonsils and fauces were involved, pain and dysphagia were again the prominent symptoms.

In general, it may be said that the cachexia and associated systemic effects of malignant disease were not in evidence in this type of case; so that one looking for the secondary anemia, loss of weight and strength, etc., as helping in an early differential diagnosis, would be deceived. It may be said in passing that in each one of these 60 cases, the clinical diagnosis was confirmed by the pathological report.

As to the duration of the symptoms in carcinoma located in each one of these four sites, antedating the time of the first observation: Tongue: average seven months; longest time, four years; shortest time, two weeks. Inferior maxilla; average, seven and one-half months; longest time, two years; shortest time, three weeks. Superior maxilla: average, six and one-half months; longest time, twenty-one months; shortest time, five weeks. Tonsil and fauces: average, seven months; longest time, eleven months; shortest time, four weeks.

A duration of seven months would be an average, therefore.

As to results: Of these 60 traced cases, 56 are

dead and 4 living, the latter seven, five and one-half, five, and two years, respectively, after operation, the lesions in these cases occurring in tongue and inferior maxilla (each 2).

In the cases recorded as dead, the average duration of life, from the time of the patient's first seeking help up to the time of death, whether operated or not, was about nine months: the longest being seven years and the shortest twenty days. Adding to this the average duration of symptoms antedating the first surgical observation, we find sixteen months to be the average duration of life from the time of the first symptoms.

Of the 43 cases operated upon, of whom 39 are known to be dead, the average duration of life was nine and one-half months or three and one-half months longer than in the non-operated cases. It must not be forgotten that 4 of these 43 are still living, as previously stated.

The operative mortality (by this meaning the deaths resulting from the operation itself) was 4, these varying in time from ten hours to four days. In each case death resulted from either post-operative shock (3) or hemorrhage (1); in none of all the 43 operated cases did there develop an inhalation pneumonia.

Our statistics would seem to show that age had relatively little effect on the time prognosis in this class of case, although the activity of the malignant process was perhaps a little less in those more advanced in years. In all those cases terminating fatally, the ultimate cause of death was the malignant process itself, usually in the form of recurrence where operation had been performed, or as a result of extension of the original lesion where no operation had been deemed advisable.

As to the site of the carcinoma as influencing tenure of life, regardless of the question of operation (in all cases dating from first observation): In case of tongue, average duration was seven months; in inferior maxilla, average was also seven months; in superior maxilla, average six months; in tonsil and fauces, average six and one-half months.

It will be seen, therefore, that seven months constituted an average, and that carcinoma of the tongue or tonsil brought a fatal termination no sooner than the same process in the upper or lower jaw.

Making a comparison of the operated and non-operated cases, merely from the standpoint of length of life (and not of physical or mental betterment), according to the location of the disease, we have these data:

Of those operated for *cancer of the tongue*, 2 are living, seven and five years respectively after operation, which in each case was partial excision. *A priori*, one would say that both of these cases must have been seen within a relatively brief time from the first appearance of the disease, and yet this was true of only one of them which was operated *three weeks* after the onset of the first symptom. The other case, now living seven years after operation, had the disease *eight months*

before seeking relief. Of those dead, the longest period was two years and the shortest one day; average fourteen and one-half months. Of those not operated, the longest duration of life was fifteen months, and the shortest fifteen days; average seven months or one-half as long as the operated cases.

Inferior maxilla: Two living, five and one and one-half years respectively after operation which in each case was a resection of one half of the jaw (in these 2 cases, the duration of symptoms before applying for relief had been six and eighteen months respectively). Of those dead, the longest, period was *nineteen months* and the shortest two weeks, average *sixteen months*. Of those not operated upon, one lived eight months, the longest, and one, one month, the shortest; average four months or one fourth as long as the operated cases.

Superior maxilla: Average duration of life after operation was seven and one-half months, the longest thirteen months and the shortest four days. We have records of only one case not operated upon, and in this, death occurred in thirteen months.

Tonsil and fauces: Average length of life after operation was eight and one-half months, the longest thirteen months, the shortest two and one-half months. The only case not operated lived six months.

As to the influence of the kind of operation performed (complete or partial excision) in lengthening life or the reverse, these again will be considered according to location.

Tongue: Complete excision, 7; average life, seven months. Partial excision, 10; average life, twenty-three months.

A disproportion here in favor of partial excision, over 3 to 1: we would recall to mind the fact that in the cases where the tongue was involved, the average duration of symptoms was seven months. At this point it must be mentioned again that the only two cases in this class living were partial excisions of tongue, operated upon three weeks and eight months respectively after the lesion was first noticed.

Inferior maxilla: Complete excision, 6; average life, sixteen and one half months. Partial excision, 7; average life, seven months. Over 2 to 1 in favor of complete excision.

Superior maxilla: Complete excision, 5; average life twelve months. Partial excision, 3; average life, five months. Slightly over 2 to 1 for complete excision.

Tonsil and fauces: Complete resection, 2; average life, nine months. Partial excision, 3; average life, four months. Slightly over 2 to 1 for radical operation.

Out of this total of 43 operated cases only *two* stand out in contrast as cured, both of these, as will be remembered, being carcinoma of the tongue on whom partial excision was made.

Most unreliable are the statements of patients suffering from malignant disease in general, when attempts are made by means of impersonal circular letters to obtain facts regarding their

condition, and their unreliability is especially marked in those affected with carcinoma of the buccal cavity where the tendency is to distort and exaggerate their post-operative sufferings as compared with the ante-operative state. Nevertheless, allowing for all this, it is a fair statement that a majority of those of whom we have been able to secure information, either through letter or personal interview, have been able to state voluntarily that the operation gave them at least temporary benefit, certainly enough to have justified the attendant discomfort and risk. Out of thirty more or less satisfactory responsive cases, an exact statement would be that two considered themselves cured, 20 temporarily benefited at least, 3 no better than before operation, and 5 worse.

Another fair inference from this list is that the comfort and comparative freedom from suffering of those patients operated upon was distinctly greater than in the case of the non-operated, even though, according to these statistics, the tenure of life was not much greater. This feeling was especially well illustrated in the case of at least five patients, who, understanding from the beginning the gravity and apparent hopelessness of their state, returned again and again to the hospital for what transient relief might be afforded. In passing, it may be said that one of these has already had 13 operations since the date of her first one and within a fortnight has expressed her intention of returning for even further treatment.

SUMMARY OF RESULTS.

Subsequent histories obtained in 60 cases: Number living, 4; number dead, 56; number operated, 43; number not operated, 17; average duration of symptoms up to time of first observation, generally and specifically considered, seven and one-half months; average duration of life post-dating first observation, whether operated or not, nine months; average duration of life from time of first symptom, sixteen months; average duration in those not operated, six months; average duration in those operated, nine and one-half months, operative mortality, 4.

In cancer of tongue, operated cases lived twice as long as non-operated cases.

In cancer of inferior maxilla, operated cases lived four times as long as non-operated.

In cancer of superior maxilla, and tonsil and fauces, there were not enough non-operated cases to justify comparison.

Effect of complete or partial excision as lengthening life: Tongue, partially excised cases lived over three times as long as those having complete excision.

Inferior maxilla: those having complete excision lived over twice as long as those palliated.

Superior maxilla: complete excision slightly more than doubled duration of post-operative life.

Tonsil and fauces: radical treatment resulted in a doubled length of life after operation.

Of 30 cases, 5 were made worse, 3 no better than before operation, 20 temporarily benefited, and 2 cured.

CONCLUSIONS.

(1) The mortality of cases suffering from carcinoma in and about the buccal cavity (based on the statistics presented in this report) is extremely high, at least 90%.

(2) All unoperated cases die sooner or later of the disease, barring intercurrent affections.

(3) The duration of life of operated cases as compared with those not operated is in favor of the former by an average of about three and one-half months.

(4) The comfort of the individual is distinctly added to (even if it be only temporary) by some sort of surgical intervention; such relief may be either mental or physical.

(5) An *early* diagnosis of malignant disease about the buccal cavity is of the greatest importance, and a moderately radical excision of parts offers the greatest hope of a radical cure, commensurate with the comfort of the patient and the immediate risk to life. We realize fully and appreciate the importance of a most radical excision of parts in and about the seat of malignant disease. We believe that, in general, such extremely radical measures offer the greatest hope of permanent cure. The surgical treatment of malignant disease situated in very many parts of the body should consist of most radical excision. On the other hand, malignant disease may be situated in and about certain parts where extreme radical excision is attended either with great immediate risk to life or may so interfere with the function of the parts that the subsequent suffering and discomfort of the patient, provided he survive the operation, does not warrant such radical treatment, in view of the great probability of recurrence. There are instances where the patient wishes extreme measures to be taken for the purpose of avoiding recurrence, and under such circumstances there is no objection to employing the most radical measures. We believe, however, that the risk and discomfort, together with the inability to offer much hope of non-recurrence, following the complete removal of the tongue, the inferior maxilla or more or less of the pharynx and larynx, should be weighed and carefully presented to the patient before such radical treatment is undertaken.

(6) Where there is extensive invasion of the parts, excision (if done at all) should be undertaken solely with the idea of palliation, without too serious interference with physiological function and without too great immediate risk.

THE USE OF THE X-RAY IN THE POST-OPERATIVE TREATMENT OF CANCER IN THE MOUTH.

BY E. A. CODMAN, M. D., BOSTON.

PERHAPS I might express all that I have to say to you in one sentence. I have never seen the x-ray do any objective good for cancer in the mouth. This statement should carry only as much weight with you as it is reinforced by the

amount of my experience, which has been confined to about a dozen cases at the hospital and five in private practice. The cases at the hospital I have not treated personally and have not followed in detail or with especial care. There have been, however, in some of these cases, distinct evidences of subjective improvement. These patients appear to derive benefit from the treatment for a time and are certainly more hopeful than if nothing was being done.

One of my private cases is particularly instructive, because I was able to do my very best for him. This patient was referred to me by Dr. J. C. Warren on May 12, 1902, for prophylactic x-ray treatment. Dr. Warren had removed most of the tongue and dissected the neck in April. The case seemed unusually hopeful because the original ulcerations, two in number, were of limited extent, and the glands removed from the neck showed no evidences of disease. The wound united well by first intention and with the exception of a small sinus in the neck, the patient's general condition was excellent. I began the x-ray treatment on May 12, and continued it faithfully through the summer. The x-ray was given not only on the outside of the neck, but through a more or less elaborate arrangement of mouth guards and speculæ into the inside of the mouth as well. Every precaution was taken to use the x-ray thoroughly, and I felt satisfied that I was giving as large doses as could be given without great risk of ulceration. The exposures were strong enough to produce signs of irritation in the mouth, and the sides of the neck had the appearance of a severe degree of sunburn. The patient was an extremely bright, intelligent, cultivated, agreeable man, in the prime of life, and Dr. Warren and I both felt that if there was anything in the x-ray prophylactic treatment, we ought to do our best in this case. During the middle of the summer, in spite of my best efforts, recurrence gradually appeared in the floor of the mouth and in the neck, and, by the middle of September had advanced to such an extent that to continue to give the x-ray seemed a mere nuisance. After the treatment was abandoned, recurrence proceeded at a very rapid rate and the patient died during the following winter. The condition of his mouth and neck before his death was simply terrible. The local process seemed to advance much faster than his general strength diminished, so that at the time of his death the ulceration in the neck had nearly sloughed through the entire neck, and it seemed a miracle that his head was still on his body. Fortunately, he took morphine kindly and enormous doses were given him.

I mention these pitiable facts merely to illustrate what seemed to be the characteristic feature of this case. That it seemed as if the long use of the x-ray had in some way increased the disproportion between the local growth and the general resistance. It seemed as if the patient lived longer in consequence of the x-ray treatment than he might otherwise be expected to have lived, but such increase as there was in the length of his existence was a thing not to be desired. I think one may oftentimes learn more by a complete case such as this, than by partial observation of many similar cases; and, naturally, since having made the attempt to prolong life in such a favorable case as this one and having seen the recurrence appear during the course of my treat-

ment, I have little confidence in the use of the x-ray in cancer in the mouth.

To offset this, is the case reported by Dr. C. B. Porter to-night, who is now living and well several years after the operation. Shortly after the wound healed Dr. Porter referred this gentleman to me for prophylactic x-ray treatment because of the leukoplakia which still existed on the remaining portions of his tongue. I gave him x-ray for a time, but I cannot say that I believe that it did good, because it is impossible to deny that he would probably have remained well in the ordinary course of events. Ultimately, the leucoplakia disappeared. Besides these two cases I have seen three others. One a patient with recurrent cancer following excision of cancer of the cheek and jaw in which the recurrence was very rapid and in which the x-ray appeared to produce no alleviation whatever, either objective or subjective. This case was referred to me by Dr. A. T. Cabot. Another case was recently referred to me by Dr. R. F. O'Neil. The patient was evidently in a very critical condition and the x-rays were merely given as a placebo. Another case of cancer of the floor of the mouth was referred to me by Dr. Charles O. Thompson. The patient was an elderly man and had had no operation except for diagnosis. The disease was so far advanced that I considered it inoperable, and as the patient fully understood the character of the disease and the probable result, I told him frankly that I thought the x-ray would be merely a waste of time and money.

Notwithstanding these discouraging results, I should still be willing to say to an inoperable, hopeless patient that the x-ray is worth trying. I should feel that to some people even this little chance was welcome, and I certainly believe that while an effort to relieve them is still being made the effect is helpful to the patient.

We know that the x-ray does make superficial cutaneous cancers disappear in some cases, and we cannot deny that it may allay the progress of deep-seated cancer; therefore, we may honestly say that it *might* do good in certain cases. Hopeless as it is, I believe that it is the most hopeful treatment we have after operation has failed. Even the unfortunate gentleman that I first alluded to, believed for many months, that he was well. However, it annoyed me excessively, long after I knew that recurrence was well under way, to be congratulated by certain of his friends as having cured him.

Treatment by the x-ray of operable cancers in the mouth is in my opinion unjustifiable, unless the circumstances are extraordinary.

THERMOTHERAPY AS A PART OF PHYSICAL THERAPEUTICS.

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"*Ubi stimulus, ibi affluxus.*"

THE European physician is to be congratulated in that during the last few years new resources have been given to him in the use of physical

therapeutics, as they have been applied with greatest success in large sanatoria, such as almost every German city now enjoys. Hydrotherapy, gymnastics with Zander apparatus, open-air treatment, sun baths, electricity, vibrations, massage and thermotherapy form the prominent part.

Thermotherapy, one of the so-called *physikalischdiätetische Heilmethoden*, is the treatment by heat. Such may be derived from our natural resources. The sun and the heat of the earth are the best and the most effective. We know that with the rays of heat combined there are other rays or so-called "ions" which have a therapeutic influence, and the radioactivity, recently found in German springs, Baden-Baden, Carlsbad, etc., has to be reckoned with as a therapeutic agent as well. The enormous quantities of heat which the sun sends out, two millions of calories per minute, are practically not made use of at all.

Sun baths were used in ancient times. The Greeks, probably through their relations with the Phenicians gave a prominent position in their mythology to Helios. Herodotus seems to have been the first to acknowledge the therapeutic effect of the sun rays. He and Antyllus recommended it in *fluor albus*, dropsy and nervous affections, especially hysteria. The Romans who had a *solarium*, a roof garden, where they took these baths, highly appreciated their value.

It is only however, in modern times that sun baths have been scientifically employed. Through the special analysis we know the difference between the chemical and heating rays.

Sun baths have been successfully used in Germany and these "*Luftbäder*" have been applied in nervous condition, such as neurasthenia, insomnia, etc. Special attention is given to them in the Sanatoria of the Black Forest.¹

Sorgo, head physician of a sanatorium for consumptives in Austria has recently employed the sun rays in phthisis laryngis. The mucous membrane shows greater sensibility to the sun rays than the epidermis. He reports a case in the *Wiener klinische Wochenschrift*, 1904, successfully treated. He treated the mucous membrane of the larynx with double reflected sunlight.

The effect of the sun rays is bactericidal as well as thermodynamic. Roux of the Paris Institute Pasteur, reported this year at the Congress of Climatotherapeutics held at Nice, that the sun rays, especially those of the southern climate, destroy bacteria, tubercle as well as tetanus bacilli, within ten minutes. This is largely due to the formation of ozone, a strong disinfectant. Whether heat or cold is advisable in disease has always been a matter of discussion among scientists. To the layman it is certainly incomprehensible that the physician should order an ice-bag to be applied one day, and warm compresses the next. The fact is that the physiological effect remains the same, for it is the nerve fibers that communicate this irritation to the cerebrum.

¹ Zettermann van Cordt: Zeitschrift f. phys. Therapie, 1904.