PLASTIC SURGERY IN WORLD WAR I AND IN WORLD WAR II[1]

JOHN STAIGE DAVIS, M.D.

Baltimore, Md.

The American Association of Plastic Surgeons is the oldest society of plastic surgeons on this hemisphere, and as far as I can ascertain it was the first group of plastic surgeons to be organized anywhere in the world for the advancement of true plastic surgery and for mutual instruction.

As a subject of general interest to the Association, I will discuss plastic surgery in World War I and in World War II. The material for this talk is taken largely from a paper, which I read before the Southern Surgical Association last December, and which was published in the Annals of Surgery in April 1946.

In World War II, plastic surgery, as a general term, was used for the first time in our medical military terminology, instead of confining the subject to maxillofacial, or facial plastic and oral surgery, as had previously been done. This, on the surface, seems a minor matter, but the change was made only after the expenditure of much blood and sweat. The field of military plastic surgery extends from the top of the head to the soles of the feet, and its object is primarily the restoration of function and comfort, and incidentally the improvement of appearance.

When we entered World War I, there was total ignorance of plastic surgery in the medical corps of the armed services of the U. S., but it must be said, that even in civil hospitals and medical schools of that time, 1917, the appreciation of this branch of surgery as a special subject was also totally lacking.

The tables of organization in the army failed utterly to make adequate provision for plastic surgery in World War I, and repeated in World War II. Unquestionably, the first world war awakened general interest in the possibilities of plastic surgery, but few additions were made during this period, 1914–1918, to the basic prinicples of plastic surgery, which had been established long years before, although some of them were *re*discovered and reported as new. As a matter of fact, there have not been any important new principles in plastic surgery developed in World War II, but simply better and more skillful use has been made of methods and principles previously devised.

In England, when the unexpectedly great number of maxillofacial wounds began to come in, in 1914, there was no one trained to take over these cases, as their ignorance of the importance of the subject was, at that time, as profound as ours, when *we* entered the war. In this emergency, Harold H. Gillies, an otolaryngologist, was assigned to this work, although he had not had any previous experience in plastic surgery. He collected a group of men around him, including dental surgeons, and at first, by trial and error, the wounded men were treated. Later, as experience developed, the maxillofacial cases to which his service was

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limited, were segregated, in a hospital at Sidcup because of the insistence of Sir Arbuthnot Lane, and splendid work was done. After our entry into World War I, a number of American medical officers, worked temporarily with Gillies at Sidcup, and obtained valuable additional experience. Full advantage was taken of the knowledge thus gained, and our own wounded requiring plastic reconstruction of the maxillofacial region, received, in consequence excellent care when they began to appear for treatment. Several U. S. Army centers were set up in France to which maxillofacial cases were supposed to be sent. One of these was Base Hospital 115 at Vichy, another was in Paris, and a third was in Bordeaux. My impression is that these centers were largely used in preparing cases for evacuation to the U. S., and that little or no definitive work was done in them. These patients were eventually sent either to General Hospital Number 11, at Cape May, N. J., or to General Hospital Number 2, at Fort McHenry, Baltimore, or to the Walter Reed Hospital in Washington, or to General Hospital Number 40 at St. Louis.

Marked progress was made in World War I in the treatment of fractures of the jaws, and in the repair of destructive wounds of the maxillae, by bone grafting and by adequate and ingenious prostheses, and these methods have stood the test of time and some have been improved upon in World War II.

There was also great opportunity to try autogenous cartilage transplants, and also iso-cartilage was used when the occasion presented and cartilage was available. Other tissues such as fascia, fat, periosteum, mucous membrane and nerves were also transplanted when needed. Some skin grafts and skin flaps were used, but very conservatively, particularly in regard to skin grafts, as compared with their lavish use in World War II.

In World War I, there were no definite regulations as to the treatment of burns, and each surgeon used his own judgement and individual methods. In World War II, on the other hand, a great deal of attention has been given to the treatment of burns, which have been very numerous. Much progress has been made, and burns are being better treated now than ever before, however, I do not believe that the final answer has yet been found. The main features in the most modern methods of treatment are the intelligent care of shock; the prevention of loss of fluids by non-adherent pressure dressings, infrequently changed; the prevention of infection, when the patient first comes for treatment and the prevention of secondary infection during dressings; the acceleration of healing by skin grafting as early as possible; and adequate nutritional care with proper vitamins, high protein diets, etc.

Artificial replacements of chins, noses, ears, eyes, etc., were devised in World War I, and are still being utilized both for permanent use and for the interval periods between operative procedures.

After World War I, scant interest was taken in plastic surgery by the regular medical corps of the armed services, and there were no surgeons in either of the services, who were especially trained for, or who showed any special ability to do this work. In fact, there was little official recognition of the scope and necessity of plastic surgery by the medical corps of either the army or the navy before we

entered World War II, as the tables of organization show. On the other hand since World War I, in civil practice, great advances have been made in almost every aspect of the art of plastic surgery, and a voluminous additional literature has appeared.

In World War II, a Subcommittee of the Division of Medical Sciences of the National Research Council on Plastic and Maxillofacial Surgery was appointed, and considerable study was given to the early care of wounds of the face and jaws by this committee, as it was realized from the experience gained in World War I, that skilled early treatment, within a few hours, if possible, after the wound was inflicted, made a great difference in the length of hospitalization and in the ultimate outcome. In order to facilitate early treatment, officers and men in the medical department in the combat zone were supplied with equipment for rendering first aid treatment for maxillofacial injuries and were instructed how to use this equipment; in arresting hemorrhage; providing adequate respiratory airway; securing temporary approximate reduction and fixation of bone fragments; and also to prepare the patient for safe transporation from the combat zone to hospitals in the rear, either in a sitting position or lying on a stretcher, face down, if there was any danger of obstruction in the air passages. Other points found to be important were—very conservative debridement of the face and hands; avoidance of packing facial wounds open; avoidance of removing any bone fragment with soft part attachment; insistence on the early closure of facial wounds by men trained to do this work; and the early covering of all extensive denudations by skin grafting or flap shifting.

The first idea about utilization of plastic surgery in World War II was that there should be a large number of plastic maxillofacial teams made up of a plastic surgeon and a dental surgeon, and that these teams should accompany troops to the front where they would give early plastic care to those requiring this service. A number of four and six weeks courses were given in different parts of the country to train men for this work. There was also one, three months course given by Jerome Webster and his colleagues at the Presbyterian Medical Center in New York City, which was excellent.

After a time, all of these courses were discontinued, as it was realized that most of the real plastic surgery, after early closure of face wounds at evacuation hospitals, should be done in the zone of the interior, and that a comparatively few trained general plastic surgeons in plastic centers, with adequate assistants and necessary equipment, could handle the situation much more satisfactorily.

No one in authority had an idea that plastic cases would be nearly as numerous as they have turned out to be in both services, and for *that* reason, the facilities at first provided turned out to be quite inadequate.

In time, nine centers in newly built Army General Hospitals, were designated for plastic work in the U. S.; the Valley Forge General Hospital being the first one assigned for this purpose on March 6, 1943, and the others were added as necessity arose. These are the Newton D. Baker; Wm. Beaumont; George W. Crile; H. D. Cushing; Dibble; Northington, O'Reilly and Wakeman, and when Northington was closed Percy Jones was made a center. The plastic patients

in these centers varied from 1000 to over 1700 on a single service, plus additional patients from the orthopedic and other surgical services. Many of these patients require multiple operations, and the operative schedule in some of the centers runs from 18–25 each day. Some of these operations are done under general anesthesia, some under local. All of them are based on the restoration of function, and none of them are of the purely cosmetic type. It is a thrilling and stimulating experience to see some of these centers in action and to observe the superb morale of the men, the team work of the surgeons and the remarkable results being obtained.

The skill, breadth of training, experience and understanding, and organizing ability of certain of the Chiefs of the Plastic Service is far greater than that of others, and in consequence, better planned and better executed plastic surgery is being done in some centers than in others. It was hoped that in due time, the work in all the plastic centers would become equally excellent. I felt that this could be accomplished by having general plastic surgeons in charge, and by having a thoroughly competent consultant in plastic surgery to supervise all centers. Then by the transfer of those unequal to the job and by adequate supervision and proper standardization of basic procedures the best results could be obtained.

The equipment, operating facilities, number of beds, number of assistants and nurses, etc., is better in some of these centers than in others, and several of them are badly overcrowded and understaffed. There has been considerable difficulty in supplying trained assistants at these centers as many men with plastic training were assigned to other work, and it has not been possible under the present organization of the Medical Corps, to get them back. Every facility is being used in some of the centers for graphically recording the wonderful series of plastic cases by moulonges, photographs, movies and drawings. In others, the equipment is poor and little interest is taken.

At the beginning of World War I, there were, with the exception of myself, no general plastic surgeons available in the U. S. In France, there was Morestin. In England, no one was trained along this line, but since then, the entire picture has changed, and there are now a number of excellent plastic surgeons in this country and in all other civilized countries. There are today very few class "A" medical schools where plastic surgery is not being taught or taught at, and in nearly all great hospitals, there are plastic services, but in the majority of instances without a complete residential service and with ridiculously few beds.

The American Board of Plastic Surgery has been organized, and there are two flourishing plastic surgery societies in operation, our own and the American Society of Plastic and Reconstructive Surgery. In consequence, when plastic surgeons were called for in this war many more trained men were available than there were in World War I

In World War I, for the first time, sections representing various special fields of medicine and surgery were established in the office of the Surgeon General in Washington, and among these sections were facial-plastic and oral surgery. Major V. P. Blair of St. Louis was called to the Surgeon General's office to or-

ganize this service. He was ably assisted by Major Robert H. Ivy of Philadelphia.

I urged at that time, that the Division be expanded to include all cases requiring plastic reconstruction regardless of the part of the body on which the lesion might be, but could not put it over, as there was no appreciation of the necessity of general plastic surgery by those with the power to act. I again urged this expansion in World War II, and some progress has been made along this line.

In World War II, in the Surgeon General's office in the Surgical Consultants Division, there have been created branches in general surgery; orthopedic surgery, neurosurgery, ophthalmology, otolaryngology, radiation, transfusion therapy and chemical warfare. It seemed strange to me, that a consultant in plastic surgery was not also added to the list. I, personally, felt that the lack of a representative in the field of plastic surgery in this war, considering the great number of casualties requiring plastic reconstruction was a mistake. In place of a consultant in uniform, several outstanding general plastic surgeons from civil life were appointed civilian consultants in plastic surgery during the last year of the war.

An inspection trip was made of all the U. S. Army plastic centers by two of these consultants, Dr. R. H. Ivy and Dr. J. P. Webster in April and May 1945, and a very comprehensive report was sent to the Surgeon General with certain well considered recommendations, but whether any of their recommendations were carried out is doubtful. No further use was made of any of the plastic consultants. I am delighted to be able to say that, although the war was over, Col. Barrett Brown was appointed consultant in plastic surgery in the Surgeon General's office in October 1945, so it was then possible to have all plastic centers under central observation and direction by an expert.

There are certain army general hospitals where there is, as there always should be, close cooperation between the plastic surgery section and every other surgical section in the hospital. In other hospitals, this cooperation is not evident, and in consequence, the most effective care of wounded men cannot be carried out. Every surgical division of the hospital, neurological, orthopedic, urological, ophthalmological and general at some time, needs the help of plastic surgery, and plastic surgery needs the help of every other division from time to time, therefore close cooperation is essential. Section or individual differences must be subordinated in order to give the wounded soldier or sailor the skilled care to which he is entitled.

The Dental Corps has an excellent organization, with active consultants, and is doing splendid work in its field. In most of the plastic centers, there is close cooperation between the plastic and dental services, and many of the problems of maxillofacial reconstruction are worked out together. The dental service is also invaluable in the construction of prostheses, plates, and various splints. However, it must be remembered, that dental surgeons, with few exceptions, are not qualified to perform plastic operations, even on jaws, on account of inadequate general surgical and plastic training.

Many orthopedic and neurological cases are referred to the plastic service for

the transplantation of soft parts to fill defects, before special operative procedures can be carried out, and some of the results are astonishing.

In a number of the army plastic centers following Dr. Sterling Bunnell's suggestion and wonderful demonstrations, hand cases requiring reconstruction have been grouped, and under plastic and orthopedic surgeons assigned especially to this phase of the work, very gratifying results are being obtained, and many hands have been salvaged, and made into useful functioning members, which seemed beyond saving.

In World War I, it was soon found that segregation of the maxillofacial cases in special hospitals or wards was most important psychologically in caring for these mutilated patients, and this should always be done, if possible, and is being done in our army and navy hospitals with plastic cases of all kinds.

At the beginning of World War I, there were no books available on the subject of plastic surgery, and although there were chapters in the surgical "Systems", nothing practical was available for the guidance of the military plastic surgeon. Since then, a number of books have been written on the subject and on its various phases. A recent contribution, written largely by Ferris Smith, is the Manual of Plastic and Maxillofacial Surgery, one of the military surgical manuals, gotten out by the Subcommittee on Plastic and Maxillofacial Surgery of the National Research Council. Another function of this committee, besides getting out the Manual, was to send recommendations to the Surgeon Generals in regard to improvements in the plastic and maxillofacial set-up in the army and navy. This was done at the early meetings on several occasions, with absolutely no results. However, things have improved.

In July 1946, the editors of a new journal, "Plastic and Reconstructive Surgery" will publish its first number. This journal will be the official organ of the American Society of Plastic and Reconstructive Surgery, and its pages will be open for papers, which are deemed worthy by the editorial committee. It is to be hoped that most of the articles on real plastic and reconstructive surgery will eventually be published in its columns. I have believed for a long time that such a journal is badly needed, and I am sure, that the editorial board will screen out much of the plastic surgery trash, that is now so freely published by many medical and surgical journals. I feel, that this journal, with its fine editorial board and excellent publisher will be a great success and should and will receive the full support of our own association.

One of the most important advances in the care of the wounded in World War II is the rapidity with which they are evacuated from the field to the hospitals where every care can be provided, and this is particularly important in the evacuation of severe burns and severe facial injuries. Sometimes, this can be done by plane in a few hours, and men are frequently back in the U. S. within a few days. There are also a number of army and navy hospital ships and trains to facilitate this evacuation.

The free use of plasma in this war has saved many lives, and the daily shipping of whole blood for use in those cases where plasma is insufficient was an added

factor of safety to the seriously wounded. All of these advances in treatment are as advantageous to men requiring plastic surgery as they are to other types of wounded.

Vast improvement has been made in the methods of anesthesia, both general and local, since World War I, and these advances have been most helpful in military plastic surgery.

The psychological handling of plastic patients requiring help along this line, is also being very well done in some hospitals and is a potent factor in securing satisfactory end results. In fact, the maintenance of high morale in the plastic wards means everything to each individual man, and also to all of the men as a group. Some of the surgeons know how to keep morale high, and in consequence, their general results are better and their wards are happier. The reconditioning program with its various activities also aids materially in helping many of the men back to a useful life.

In plastic surgery in this war, as always, asepsis should be aimed at, as often with scant tissue available for the reconstruction, infection may destroy the chance of the desired repair. But in battle wounds, infections frequently follow in spite of every precaution. In these instances, the wounded man today has a much better chance than he had in World War I, as with the local as well as the internal use of the sulfonamides and with the free use of penicillin and other substances, infections are prevented or controlled, and many cases which would previously have been fatal are saved.

In the European Theater in World War II, the Chief Surgeon, Major General Paul R. Hawley, promptly appointed a full set of consultants, including the specialties. It was foreseen early that a great number of war casualties would require plastic reconstruction, and their care could best be met by central direction. The first consultant was Lt. Col. J. Barrett Brown, and as his assistant Major Eugene M. Bricker.

It was difficult to establish plastic surgery as an army specialty, principally because of the lack of plastic surgeons on the tables of organization. However, great progress was made with the full support of the Chief Surgeon.

The first plastic center in E.T.O. was established in December 1942 at the 298th U. S. Army General Hospital, and on "D" Day, June 6, 1944, about 18 months later, there were ten functioning U. S. plastic centers in the United Kingdom where plastic, maxillofacial injuries and burns were treated. The purpose of these plastic centers was to treat early, and restore to duty promptly those with minor injuries and to evacuate to the U. S. as soon as possible, all those more seriously injured, who could not be returned to duty in from 120–180 days.

These centers were established within easy ambulance haul of the areas into which the patients were evacuated by air, water or hospital train, as it was important to get them into the hands of the plastic surgeons as soon as possible after injury.

On the continent as the invasion progressed, there were 11 or 12 plastic surgery centers in different hospital groups. Those of particular importance were at

Liege and Paris. The one at Liege functioned as a transit center for air evacuation of plastic patients to the U. S. Army centers in the United Kingdom. The two in Paris functioned for air evacuation of patients to the U. S.

In the Mediterranean Theater, no permanent plastic center was set up. Temporary designations were usually established in one of the general hospitals. The first one was in the 33rd General Hospital at Bizerte. During the Italian campaign, there was such a center, the 52nd Station Hospital, in Naples.

In the Pacific area similar arrangements existed toward the latter part of the war. In those areas throughout the world where special plastic facilities were not available, excellent work was done on plastic and maxillofacial cases by plastic and dental surgeons assigned to this work in different hospital installations as allowed by the tables of organization.

In England in World War II, Sir Harold Gillies, with his colleagues, has charge of all plastic surgery, and there are plastic centers at Basingstoke, Gloucester, Birmingham, Edinburgh and probably other places.

All British maxillofacial casualties in the African campaign were segregated in a center in Algiers, and in Italy a similar center was set up in Naples. Remarkably fine work was done on these patients, who were usually received within the first few hours after injury.

In South Africa, Major Jack Penn and his staff have done fine military plastic surgery at "Brenthurst" and later at the Witwatersrand University Hospital. Some of us have been fortunate in receiving "Brenthurst papers" edited by Major Penn.

Little authentic news about the progress and practice of military plastic surgery in World War II has come as yet from either the Russian Medical Corps, or from the military services of the Axis countries.

In World War II, as in World War I, there have been many more wounded men requiring plastic and reconstructive surgery in the army than in the navy.

In the U. S. Navy in World War I, there was no special service organized for the care of plastic cases. In World War II, the same procedure was followed at first, as it was said that the Surgeon General of the Navy did not see the necessity of a plastic section, and thought that any naval surgeon should be capable of doing plastic work. However, when a considerable number of men requiring real plastic reconstruction began to come in, this misconception was soon rectified, and with the help of a group of naval reserve medical officers, who were skilled plastic surgeons in civil life, several plastic centers were organized. In the center at San Diego, California, under Capt. H. L. D. Kirkham and his staff, who had been provided with fine equipment, large numbers of sailors and marines requring plastic work were splendidly cared for. There are several other naval plastic centers, where excellent work is also being done, one at the U. S. Naval Hospital at Bethesda, Md., another at St. Albans, L. I., another at the Oak Knoll Naval Hospital, Oakland, California, and another at Great Lakes. So the Bureau of Medicine and Surgery also waked up to the importance of having plastic work done by trained plastic surgeons. It is to be noted, that

there has been no special consultant in plastic surgery in the office of the Surgeon General of the Navy during World War II.

Now the war is over, what will be done with those men in the U. S. plastic centers on whom plastic reconstruction has not been completed, and also with those who will require operative treatment over a period of years?

In order to get information for the Association on this subject, on April 26, 1946, I wrote to the Surgeon General of the Army and also to the Surgeon General of the Navy, asking certain questions and telling them that the information furnished would be passed on to you at this meeting. I have received the following information from Major General Norman Kirk, the Surgeon General of the Army, dated, May 2, 1946, which will give an idea of what the army plans to do.

"1. Plastic centers are currently operating in the following general hospitals:
Cushing, Framingham, Mass.
Valley Forge, Phoenixville, Pa.
O'Reilly, Springfield, Mo. (closed Sept. or later)
Percy Jones, Battle Creek, Mich.
Wakeman, Camp Atturbury, Ind.
Beaumont, El Paso, Texas.
Crile, Cleveland, Ohio.
Newton D. Baker, Martinsburg, W. Va.
Dibble, Menlo Park, Calif.

2. The following hospitals are due to close approximately June 30. No more plastic cases are being admitted thereto. In the case of Beaumont General Hospital, it does not close but it is receiving no more plastic patients and will close as a plastic center.
Crile, Cleveland, Ohio.
Newton D. Baker, Martinsburg, W. Va.
Dibble, Menlo Park, Calif.
Beaumont, El Paso, Texas.
Wakeman, Camp Atturbury, Ind.

3. By the end of June 1946 it is anticipated that 3100 plastic cases will be remaining which require treatment. When Dibble closes, the plastic cases, along with the personnel necessary to do the job, will be transferred to Letterman as a group, thus opening a plastic center at Letterman. With the closing of Cushing and Valley Forge late in 1946 or early in 1947 a plastic center will probably be established at Walter Reed.

4. Early in 1947, the remaining plastic cases will be treated at Letterman, Walter Reed and Percy Jones.

This will be the plan—which is subject to change according to the work load. We are planning to separate those doctors who have been frozen and promoted as early as their services can be spared. The criteria for separation will be based on the number of points and length of time in service—if the individual's services are no longer needed."

Plastic cases in the permanent military hospitals will probably be taken care of by the young plastic surgeons, who have been trained in the plastic centers, as long as they can be retained in the army. There is also the possibility of training a few regular army surgeons to do this work, and then again some of the men now trained in plastic surgery may decide to remain permanently in the regular army. I understand that there may also be civilian plastic consultants at strategic points in the U. S.

In those plastic cases where treatment will have to be continued for several years, it is probable that these patients will be turned over to the Veterans Administration, if they are willing to be transferred, and if the Veterans Administration has facilities which are comparable with those in which the men are being treated in the permanent army plastic centers. But I understand that the army has no intention of even trying to transfer these patients until entirely adequate facilities, both physical and professional, have been assured.

The Surgeon General of the Navy, Vice-Admiral Ross McIntire writes as follows, dated May 22, 1946.

"The Navy has, at the present time, five plastic surgery centers in the Naval Hospitals in St. Albans, New York; Bethesda, Maryland; Great Lakes, Illinois; San Diego, California; and Oakland, California. There are approximately seven hundred patients in these five centers undergoing plastic procedures. Of course, there are a few plastic surgical cases in the other Naval Hospitals, but the majority are concentrated in the centers.

It is planned in the near future to disestablish any excess of these centers as the needs indicate. However, the Navy plans to retain permanently sufficient plastic surgery centers to meet the continuing requirements. The centers will be maintained in the most desirable geographic areas consistent with availability for patients and plastic surgery consultants."

It is interesting to note how plastic surgery is handled in Canada. The Navy, Army, Air-force and Department of Veterans' Affairs have joined to provide specialty surgery of all varieties. As far as plastic surgery is concerned, these joint service special treatment centers are in Montreal, Toronto and Vancouver. The work of these units has been supervised by a Joint Service Advisory Committee to the directors of Medical Services of the Navy, Army, Air-force and the Department of Veterans Affairs. The joining of the active services with the Department of Veterans Affairs has worked out very well for specialty surgery. Now the war is over, the Department of Veterans Affairs is taking on skilled workers from the armed services, and the units will eventually no longer be combined service, but *completely* Veterans Affairs.

The efficacy of the Canadian system has been demonstrated to us by the splendid work in all plastic fields which we have had the privilege of seeing in Toronto.

To sum up in a few words, I can say without reservation, that the wounded service man in World War II, who requires plastic reconstruction, has been better cared for in almost every way than he could have been in World War I.

The superb results obtained in most of the armed service hospitals by the trained plastic surgeons and by the younger surgeons under their direction, have been among the outstanding triumphs in the surgical annals of World War II.

Those of you, who have participated actively in this work have every reason to be congratulated on a job well done, and those of us who have been civilian consultants and lookers on, are proud of you, and of what you have accomplished for the wounded men and for plastic surgery.