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ORIGINAL PAPER

Facial reconstruction in Italy during the First World War

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Abstract

Background The field of plastic surgery, and in particular facial reconstruction, advanced rapidly during the First World War, but the Italian contribution is little known.

Methods This paper explores wartime experience in Italy, with particular reference to the unit of Amedeo Perna in Rome, as illustrated by the diary and photographs taken by Emerin Keene, the daughter of the American Consul-General in Rome in 1918, who worked as a nurse in the Ospedale Stomatoiatrico, located in the Villa Massimo.

Results The diary of her nursing experience provides an insight into the workings and day-to-day life of the hospital.

Conclusions Whilst there has been interest in, and publication on developments in Great Britain, France and Germany, no significant review of the Italian experience has been undertaken. This article examines the clinical material described by Emerin Keene and the contributions of other Italian contributors to wartime facial surgery, setting these in the context of developments elsewhere in Europe, but further research on what appears to be extensive Italian work in the First World War seems merited.

Level of Evidence: not ratable

Keywords Facial reconstruction · Plastic surgery · First World War · Villa Massimo · Ospedale Stomatoiatrico · Colonel Amedeo Perna · Italy · Interallied Dental Congress

Introduction

Plastic Surgery techniques advanced significantly during, and as a result of, the First World War. Not only did trench warfare result in an escalation in the number of combatants requiring facial reconstruction, but it also brought the specialty of plastic surgery to the forefront of medicine. Many pioneering surgeons of the time focused on this field. However, little has been reported about plastic surgery advancement in Italy in the First World War.

The war provided innumerable facial casualties on all war fronts. Changes in the pattern of warfare, with the use of massive artillery barrages and the introduction of the machine gun amplified the effects of close-quarters fighting, and after the introduction of steel helmets wounds to the head and face that would have been fatal became survivable. From a surgical point of view, the mass of casualties provided a ready source of material. Early surgeons were limited by the lack of understanding of infection, the absence of effective anaesthesia and what might be termed rudimentary technique. Surgeons interested in facial injury were few. Thus reconstructive advances were limited. The custom of surgical autocracy also inhibited the dissemination of technical advance.

In France and Germany, professional isolation continued throughout the War, whilst in Great Britain the establishment of a single centre specialising in facial surgery led to major advances, partly as the result of multidisciplinary working between surgeons and dentists at the Queen's Hospital, Sidcup [1].

In Italy, the organisation of a dental service that was also prepared to deal with dental and maxillofacial problems had been coordinated early in the war. A number of centres have been established within major hospitals, with some 700 'surgeon-dentists', 300 'active-dentists' and 600–700 technicians [2]. Although these were autonomous units, there appears to have been a degree of coordination in record-keeping.

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The Interallied Congress, Paris, 1916

An attempt was made to share information between the Allied nations via an international congress held in Paris in 1916, but this was primarily a dental, rather than a surgical, meeting. Nonetheless its proceedings formed a weighty two-volume work [3]. Harold Gillies, later to be recognised as the father of modern plastic surgery, attended as a representative of the British Royal Army Medical Corps, but did not contribute. The senior British representatives were senior army medical men, Sir Anthony Bowlby and Sir Wilmot Herringham, the heads of the British surgical and medical services in the field respectively. There were also two dentists from Manchester. Gillies only began his facial work at Aldershot in early 1916, and so was not in all probability in a position to contribute (he was an ear, nose and throat surgeon by training), and the Sidcup unit did not open until mid-1917.

The Italian participants in the Congress

The Italian attendees were listed as Chiavaro, Musumeci, Pröia, Zunini, Maggioni and Perna, all without initials. Angelo Chiavaro (Rome) wrote two summaries of his experience [4, 5]. He also provided a list of the Italian hospitals providing surgical services and included staff in charge of the units [see Table 1]. Musumeci and Zunini were noted to be working under his supervision in Rome. Aldo Maggioni (Milan) and Giuseppe Pröia (Order of the Red Cross of Malta Hospital, Rome) also contributed [6, 7]. Maggioni's contribution addressed the need for continuing support for injured soldiers after the war. Amedeo Perna gave a paper on the organisation of dental services within the war zone and described his role as developing a stomatology course in Rome for frontline officers; this included a revision course in oral anatomy [8]. He noted that the worst injuries were occasioned by shells and grenades, with lesser injuries from rifle fire, and shrapnel wounds being the least severe. This relates to shrapnel in its original sense; a shell packed with lead balls—rather than to the modern use as a generic term for any shell fragments. In addition, Vicenzo Guerini (Naples, No. 2 Red Cross Hospital) contributed a paper on maxillary injuries in which he lamented the late arrival of casualties to the service, so that 'bone fragments had already reunited in an abnormal position, fixed by an extremely strong, inextensible cicatricial tissue, and when, even if one sees and incises this tissue, the fragments cannot be brought back to their anatomical position, because the soft parts, too, are already permanently contracted' [9]. He also made reference to his regret that medically qualified stomatologists have pulled rank and influenced the government so that dentists were not integrated into the service, thus reducing the manpower of able practitioners. This was clearly not a universal issue, because Chiavaro commented in discussion that dentists, and dental technicians, were in his view essential staff members and had listed in his main contribution 27 dental units, acknowledging that his list was incomplete.

Table 1 Italian jaw injury units during the First World War

Bologna	Gozzardini Hospital
Chieti	Principal Reserve Military Hospital
Firenze	Foligno Hospital
Milan	Santa Corona Military Hospital
Naples	Vittorio Emanuele Hospital
Pavie	Military Hospital
Rome	Principal Military Hospital
Sassari	Red Cross Hospital
Turin	Principal Military Hospital
Venice	Red Cross Hospital Marco Foscarini

Very few of the conference presentations described surgical techniques or contained photographs or diagrams. Guerini did present two cases illustrating an apparatus to realign jaw fragments, and a helmet and chin strap device to replace the standard technique of bandaging [10, 11]. However, despite the professed aim of the Congress to disseminate good practice it is difficult to see how its proceedings fulfilled the aspiration.

Chiavaro was the leading Italian participant, giving one of the opening addresses as a representative of the delegates of the allied dental societies participating in the Congress [12]. He is mentioned by the American dentist Newell Sill Jenkins in his memoir:

> We saw Chiavaro and his madonna-like wife in Rome and found them, even in these confused times, as overwhelmingly kind and hospitable as ever. It was evident what they expected and I told Chiavaro that if, and when, Italy went to war, my cousin Charles had authority to make a contribution from me to the aid of the oral surgery department, to which I was sure he would be appointed. In a few weeks conditions were as I anticipated and for the reason that I started this fund and had promised a monthly contribution to the American hospital in Florence for the duration of the war, I was later awarded the diploma of the Italian Red Cross, which it gave me much pleasure to receive afterwards in America [13].

It also appears that he was involved with the American philanthropist George Eastman, who was actively involved in assisting service development in Italy. There is a brief reference to him in a survey of the origins of Italian dental practice, which also mentions Aldo Maggioni [14].

The dentist Vincenzo Guerini (1859–1955) had a distinguished pre-war career. The preface to his history of dentistry from early times to the end of the eighteenth century lists numerous appointments, including life presidency of the Italian Stomatological Society and appointment to the Royal Household, as well as being editor of the Italian review *L'odonto-stomatologia* [15]. He is also the subject of a modern biography [16].

Apart from the contributions to the conference noted above, we have been unable to find any reference to the (clearly extensive) body of Italian facial surgery work in the literature.

The Villa Massimo, Rome

The reputation of Amedeo Perna (1875–1948) grew when he worked at the Italian Front, organising front-line dressing stations. This led him to work in the Marco Volpe hospital in Udine. By 1918, Udine was in the hands of the enemy, and Perna was transferred to oversee surgery in the Villa Massimo near Rome which had become the Ospedale Stomatoiatrico, a hospital for plastic surgery of the face. The Villa, a German cultural centre, had been requisitioned by the Opera Nazionale per la Protezione e l'Assistenza degli Invalidi della Guerra (National Organisation for the Protection and Assistance of War Invalids], which had been established to ensure the proper management of, in particular, orthopaedic and prosthetic services in March 1917. The American dentist Albert Webb, who had previously been a dentist to the House of Savoy, also worked at the hospital.

There does not appear to be any surviving record of the wartime work of any of the above-mentioned Italian practitioners. Given the apparently large number of practitioners dealing with facial wounds this is surprising. However by chance a written account and photograph album of Miss Emerin Keene came into the possession of one of the authors (ES).

Emerin Keene, (EK, Fig. 1], born in Milwaukee, Wisconsin on 27 August 1894, was the daughter of Francis B. Keene, American Consul-General in Rome during 1918. She was a keen amateur photographer. She, and her sister Miss Carolyn Keene, worked as volunteer nurses with the American Red Cross in Spring 1918 at the Villa Massimo. EK took numerous photos, pre and post-surgery, of the patients that she cared for and her diary details the workings and day-to-day life of this hospital. Her account entitled 'A Pen Portrait of Hospital Life' with the photographs provides a previously unpublished and perhaps surprising insight into both the surgery undergone by the men and their attitudes towards their injuries.

Fig. 1 Miss Emerin Keene

Emerin Keene's notes and photographs from the Villa Massimo

Almost all the patients at Villa Massimo were Italian soldiers. There are 26 numbered pairs of 'before' and 'after' photographs; one of the photographs is annotated 'Terrified Austrian soldier taken prisoner by Italians'. There are a further six unnumbered photographs, and the album contains a photograph of Amedeo Perna [Fig. 2], two of EK and five group photographs. The majority of patients were aged 19 to 20, with significant facial injuries caused by shell fragments or bullets. 'Patient number one' [Fig. 3] was an ex-tram conductor who EK reported was able to mimic a cat to perfection and so was known as 'il gatto' (the cat) by his companions. The cosmetic result is good, but there are no X-rays to elucidate the extent of any bone loss, and no note on subsequent function. Another patient undergoing innovative surgery was 'patient number 21', Moroni [Fig. 4]. He was the victim of a shrapnel injury that had destroyed one eye and left a large defect in the cheek from which his tongue protruded. EK described his surgery: '…neither chloroform nor ether can be used, as the mask would interfere with the work; so the patient is obliged to remain absolutely quiet for about two hours beforehand, during which period local injections of some anesthetic are administered... At intervals during this particularly tedious four-hour operation, the Colonel would speak to Moroni in a

Fig. 2 Colonel Amadeo Perna

slow voice, and always received an intelligible reply… When the strip of carefully measured skin from his neck had been grafted onto the cheek – experimentally and without cutting it off from the blood supply in the neck – a new eyelid had been marvelously formed to welcome the glass eye.' It took 22 operations for patient number 21 to return to a semblance of normality. Although EK left before the surgery was completed she recorded that he could already chew and eat for himself.

Several patients show evidence of scar contracture after closure of the primary defect (e.g. patient 24, Fig. 5).

Some soldiers stated that they preferred life with a disfiguring facial scar to the intense suffering associated with the complex and prolonged operations, with uncertain outcomes. For those, the Colonel had a clever persuasion technique. He would put in the same ward as the reluctant patient, a man who was convalescing from a successful operation, telling him that if he could persuade his companion to agree to an operation, using his own recent painless transformation as an example, his 'licenza' or home leave before returning to the barracks, would be extended. This saved the nurses and surgeons many hours of trying to persuade the injured to undergo an operation, and also gave the convalescing patient a means of passing the boredom whilst recovering.

Not every patient was a war casualty. Casualty No 17 was admitted after being shot by his wife whilst on home leave from the front, leaving him with a hole in his cheek and fractured mandible and maxilla. The photographs suggest a shotgun injury [Fig. 6]. EK wrote 'No one knew the ins and outs of the story… of course the poor chap could only utter queer sounds… His wife was evidently cleared of blame, for some days later she came to see him, accompanied by three relatives… he simply looked daggers as she whispered a few words to him.' Following surgery EK noted he had put on weight, and she 'almost miss[ed] the mysterious gloom of my wan "No 17" with his tragic and hidden history.'

Boredom was a big problem for convalescing soldiers. EK highlights in her diary the attempts the hospital made to try to relieve this. There were limited resources and many of the soldiers could barely read. When a small library opened in the Villa it was immediately extremely popular, and soon after that an American lady presented to the hospital with a large box of drawing and painting materials, giving the convalescing soldiers an occupation and interest. During the warmer seasons, a vegetable garden was started on a part of the hospital grounds, giving the men exercise and enabling them to make a little money through the sale of vegetables produced in the garden.

Another distraction was a little mongrel dog in the hospital that had wandered onto the grounds and was immediately turned into a special mascot for the soldiers. At first, they hid it under their coats from the Colonel, but when he did not raise an objection, the little dog was doted on by all. After that the hospital acquired pigs and rabbits, providing the convalescing soldiers with more activity in their day-to-day lives.

The visits of Miss Francesca Bertini, a famous movie actress, were particularly popular with the soldiers. She came to act love scenes with the picturesque Villa Massimo as a background. When this happened, the soldiers would congregate at every window. All the sentimental parts were met with laughter from the soldiers.

Occasionally there were conflicts between patients. EK records a problem with two men who 'were rivals in love, and

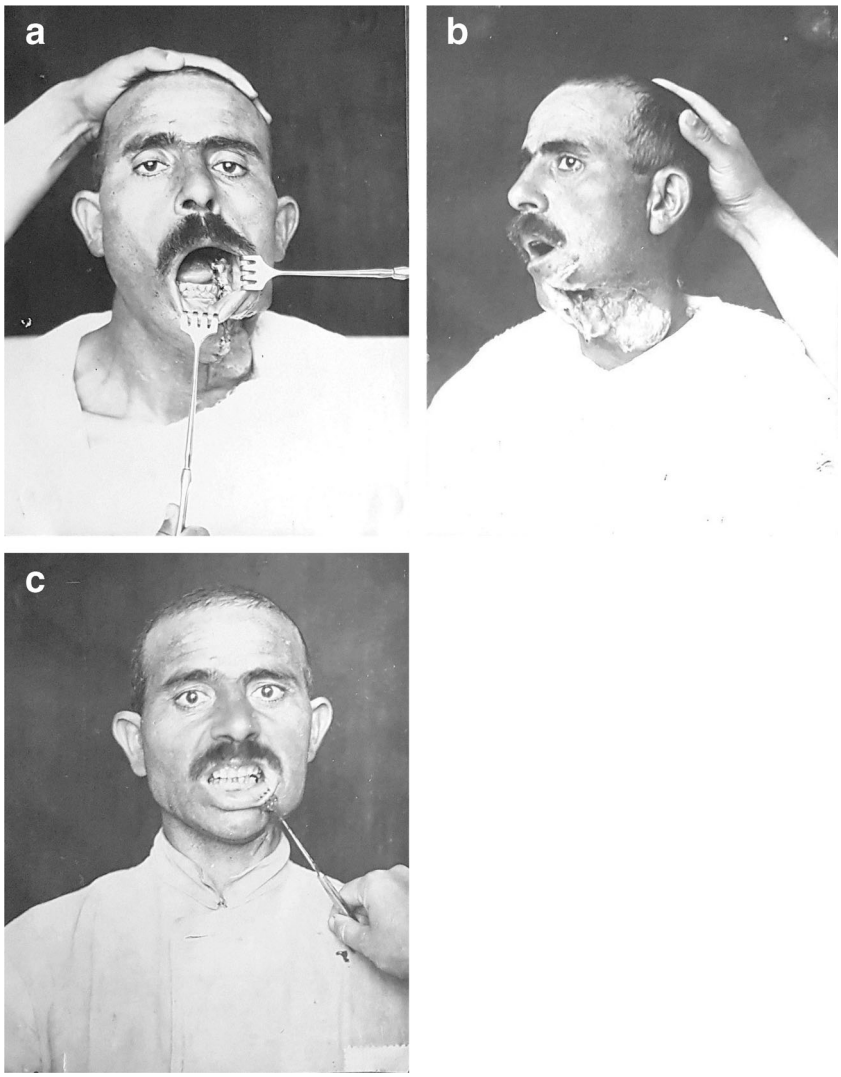

Fig. 3 **a**–**c** Case 1, before and after surgery

who, by an unfortunate chance, got "over the garden wall" on the same night, meeting unexpectedly in the house of the enchantress… had they been locked up together next day when their punishment was meted out, our ward would have had at least one man less to care for.'

EK describes in her diary the day-to-day workings of the wards in Villa Massimo. On her very first morning, whilst making the rounds with Dr. Webb, she watched as he prepared the men's mouths for surgery. Dr. Webb had to fill vacant spaces in the mouth with teeth, as well as making 'blocchi'-blocks that kept the lips in a normal position to give the surgeon a solid foundation on which to remodel the face during the operation [Fig. 7]. Many of the patients had facial paralysis from injury to the facial nerve, with an already healed wound, or limitation of movement of the temporomandibular joint, and were fed in the same way as 'lockjaw patients' (patients who had tetanus-induced trismus). Patients lived with a distraction splint protruding from their closed jaws, and each day this machine received a new turn from the surgeon so that gradually their jaws would yield and separate. According to EK, many men would hide in the farthest parts of the garden after the doctor's visit, without the metal contraption, pretending the next day that they had had it on the whole time. As a result, recovery was slow with treatment continuing for many months with very little visible improvement.

The account indicates that there was considerable enthusiasm among the patients to be photographed in groups. Keene writes:

> My own personal contribution to the general morale of the soldiers was my very much overworked camera. The first time I appeared with it there was a roar of delight - and before I knew it I had about seventy-five following me to the front terrace, though I had only requested "a small number to make up a characteristic group. Our progress, however, was like a 'snowball' - in a few minutes I had used up all my films with the different groupings. After that, seeing how much real pleasure it gave,

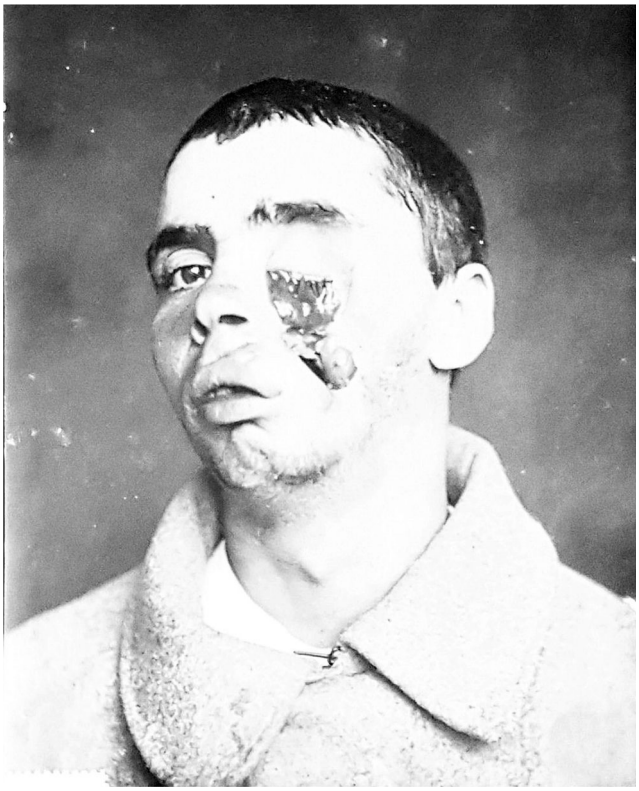

Fig. 4 Case 21: Moroni

> in the anticipation of sending a photograph to 'mother', 'wife' or 'sweetheart', I appeared at regular intervals on the same smile-bringing mission... At one time I thought of teaching the soldiers to do their own printing, but decided to refrain lest the acid bottles get mixed with the medicine bottles...

Villa Massimo ceased being a hospital after the war and is now a German cultural institution. Its history is outlined on its website [17]. The fellowship at Villa Massimo German Academy in Rome is one of the most prestigious awards offered to extraordinary artists for study abroad. The award offers residency for 10 months at the Villa Massimo to ten artists who have excelled in Germany and abroad, including architects, composers, writers, artists.

The context of Italian facial surgery

Trench warfare in World War One produced much greater numbers of wounds to the head and neck than had occurred in any previous war. At the beginning of the war there was no established specialty of plastic surgery in Europe or America. Any surgery that needed to be undertaken was at first performed by general surgeons. Medical literature on plastic surgery techniques at this time was often contradictory, focused primarily on wound healing or simply ineffective, without consideration for the functional or aesthetic result. However during the War, it was quickly realised that soldiers returning to the front with disfigured faces lowered morale. Furthermore, the number of casualties was substantial and thus war, once again, was a catalyst for the advancement of surgical techniques through the work of specialty pioneers such as Charles-Auguste Valadier, Harold Gillies and his Sidcup colleagues, and the American dentist Varastad Kazanjian.

A few contemporary press accounts described Perna's work at the Villa Massimo. One, in the American press, entitled 'Miracle men of surgery!' reads '…They are not only those in the great hospitals of France, whose deeds are well known to the reading public of America. From Italy come more stories of the marvelous work of Colonel Amadeo Perna. a surgeon of Rome, whose fame is reaching over the

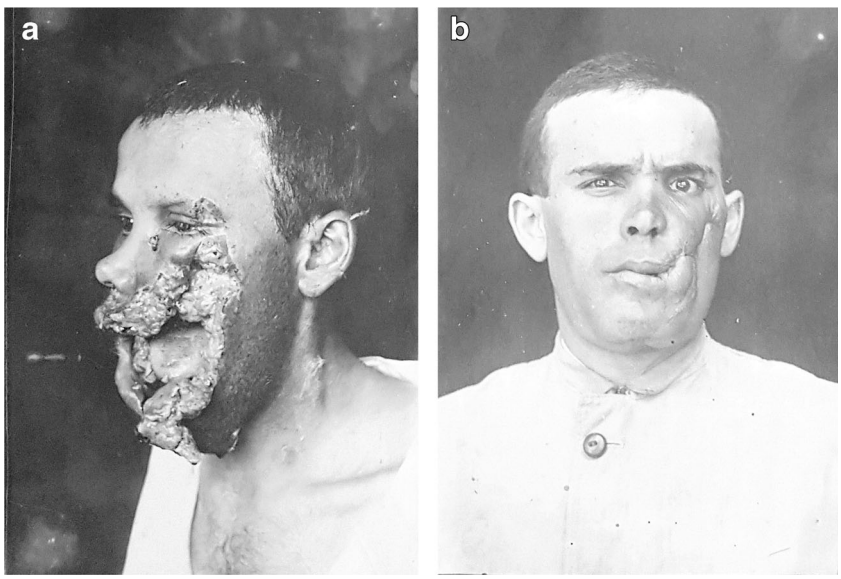

Fig. 5 **a**, **b** Case 24. Primary repair has resulted in contracture in the cheek, pulling down the lower eyelid. No attempt has been made to reconstruct the lip margin

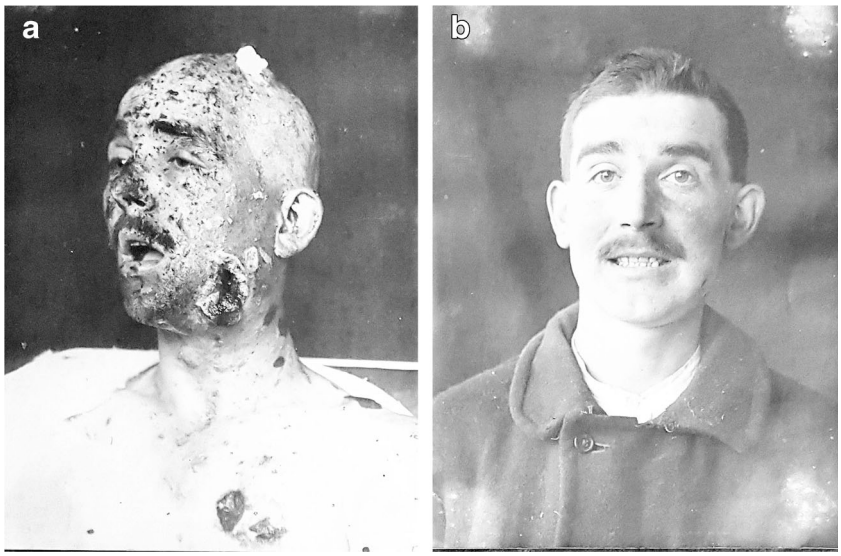

Fig. 6 **a**, **b** Case 17. The patient was shot, presumably with a shotgun, by his wife. The circumstances are not known

world. I have just talked with a Y.M.C.A. field man, returned from Rome, where he visited the unique hospital Stomatoiatrico for "those who are wounded in the mouth. He saw Perna, the miracle man, at work…' [18]. In view of this hyperbole, which echoes the press responses to the work of Kazanjian and Gillies. It is perhaps surprising that Perna's work is not well known, not least as Keene's descriptions imply a clear understanding of reparative techniques.

EK's account is testament to the compassionate care given to the facial injury casualties, but it is a rare account by a nurse recording the working and day-to-day activities of a facial hospital. There is only one account from Britain [19]. In describing Italian experience, the account appears to be unique.

It is apparent that anaesthesia was primitive, with the use of extensive local anaesthetic infiltration rather than of inhaled agents. We do not know how many patients in total were treated by Perna, but it cannot have been large. In this sense, the Italian experience seems to be akin to that in France, where a number of small units, each with a small staff, did not have the opportunity to compare notes on large numbers of cases and discuss causes of failure. It appears that primary closure across a wide defect was considered acceptable, resulting in distortion because normal tissue was not restored to normal position [Figs. 5 and 8]. Whilst recreative rehabilitation occurred, it seems that occupational rehabilitation was very limited, and we argue that this is due to the primacy of dental surgeons in this work, whose experience of dealing with major injury, in contrast to medically qualified surgeons, may have limited their understanding of the need for both rehabilitation and psychological support. EK's account indicates that much

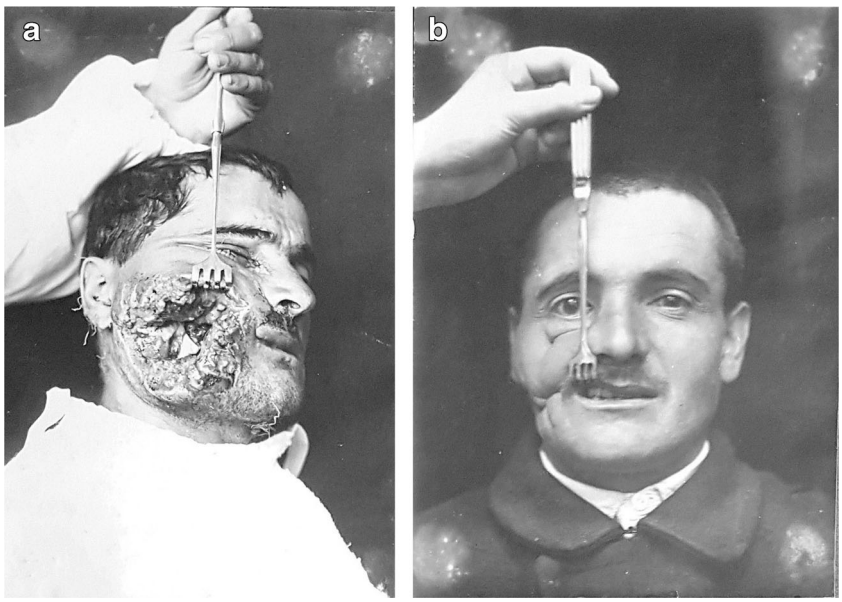

Fig. 7 **a**, **b** Case 7. The 'after' view shows flap oedema from what is probably a flap from the neck

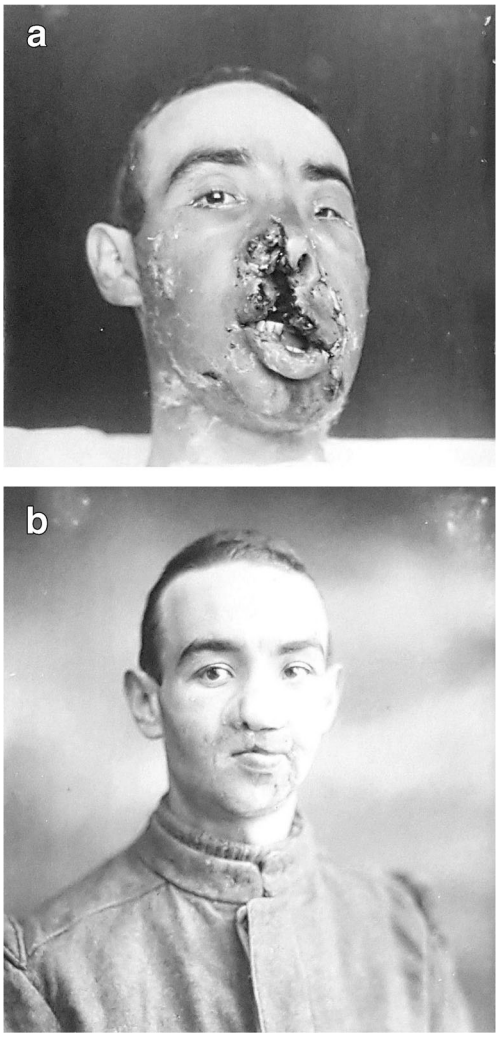

Fig. 8 **a**, **b** Case 3, annotated as a 'terrified Austrian soldier'. The reconstruction has produced a good cosmetic result, though there is slight updrawing of the upper lip

of this latter was left to the nurses. The use of previously treated patients to encourage reluctant casualties to undergo surgery, as Perna arranged, is, however, an imaginative psychological stimulus and the patients' pleasure in being photographed belies the concept that all facially injured men were distressed by their injuries.

The absence of publications by Italian surgeons on their work in the war

The experience of Italian surgeons dealing with facial injury during the First World War is almost unrepresented in the literature. A review article recording the contributions of Angelo Chiavaro contains no reference to his wartime work and we have been unable to find publications elsewhere from the Italian attendees of the Interallied Congress other than those shown in the Congress report [20]. As stated above, given the large number of dentists who were involved in war work this is surprising but may reflect the absence of any retained records. EK's album and pen portrait were the private work of an amateur. Thus, the Italian experience appears to be at variance with that in Britain (where regular reports and case descriptions appeared in medical journals, case files from Aldershot and Sidcup were preserved, and where Gillies produced a plastic surgery manual in 1920), that in France (from where Valadier's records were transferred to the Royal College of Surgeons in London, and those of Morestin retained by the Val-de-Grâce Hospital in Paris) and America (where the case files of Varastad Kazanjian were transferred to Boston). It also mirrors the relative lack of progress in surgical management seen in France and engendered by professional isolation.

Amedeo Perna: why has he been forgotten?

There are three further possible explanations for the absence of information about Perna's work at Villa Massimo:

1. Professional rivalry. Perna and his colleagues were primarily dentists, not surgeons and it seems likely that the rivalry between medically trained stomatologists and dentists as noted by Guerini may have suppressed the contributions of the dentists. Perna produced a textbook in 1938, but its circulation appears to have been limited, and it is a dental rather than a surgical book [21]. There is evidence from elsewhere in Europe that disagreements between surgeons and the drawing of demarcation lines hindered collaboration. For example, Valadier worked in British base hospitals in France, his offer to work for the French having been refused because he had no medical qualification. Likewise, Johannes Esser in Germany found positive obstruction thanks to the autocratic behaviour of a senior German surgeon [22].
2. Politics. In the early 1920s, Perna was heavily involved in Italian politics and diplomacy, becoming a close confidant of Benito Mussolini. In 1924, he was in the USA as a special representative of the Italian government to finalise a donation by George Eastman for a new dental institute to be built in Rome [23]. The agreement meant that Italy was the first country in the world to recognise preventative dentistry. But whilst Perna's star rose that of Chiavaro sank. As professor of dentistry and dental prosthetics at Rome's university, he had been instrumental in proposing a national school of dentistry. A decree enabling this was passed in late 1923, but it was rescinded after 10 months—possibly because Perna's efforts had produced a similar end result and were supported by his political allies. Chiavaro nevertheless continued to agitate for the decree's reinstatement, evidently to the irritation

of the authorities, for he was summarily transferred from Rome to Genoa in 1928, his place in Rome, perhaps unsurprisingly, being taken by Perna who was described as having "important connections in the national Fascist Party".

3. Perna's actions may also have had a medico-political background. As Vicarelli and Spina write: 'Indeed, fascism, which was based on the consent of the middle classes, could not ignore the requests from physicians, nor those from academic elites, who opposed the autonomy of the dental profession. Hence, more than 60 years after Italy's unification, and coinciding with the decline of liberal governments, it was definitively established that the profession of medicine included that of dentistry. Thus, a degree in medicine was sufficient to practice dentistry, which meant that any graduate in medicine—and, therefore, primarily general practitioners as nonspecialists—could be dentists' [24].

Thus, whilst Chiavaro fell foul of the Italian fascist regime, and suffered a significant diminution of influence, Perna's fortunes were tied to fascism. Maybe, therefore, his present status perhaps reflects that of other health professionals associated with the mid-twentieth century central European dictatorships who have attracted opprobrium or been airbrushed from history after the Second World War because of their political beliefs [25].

Conclusion

Plastic surgery and, in particular, facial reconstructive surgery, advanced significantly during the First World War but the contribution of the large number of Italian dentists and surgeons has been largely forgotten or ignored. The discovery of Emerin Keene's diary and photographs has allowed us to redress this lacuna. We ask whether there are any other surviving records from other units which might flesh-out evidence of the techniques employed and the technical advances made by Italian practitioners. Certainly, whilst Amedeo Perna's work was limited in a surgical scope and in isolation from other surgical facilities, and notwithstanding his political sympathies, his unit should take its place in the historiography of surgical achievements of the First World War.

Emerin Keene married Mervyn Lyde Chute in 1929, and died in England in December 1976.

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Compliance with ethical standards

Conflict of interest Emily A. Stone and Andrew N. Bamji declare that they have no conflict of interest.

Ethical approval N/A.

Informed consent N/A.

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