Endurance, Courage and Care: The Kokoda Campaign of Captain Alan Watson and the 2/4th Field Ambulance

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Abstract

Many of the modern principles of combat health support were displayed in the critical 1942 Kokoda campaign of the 2/4th Field Ambulance. The photographic collection and war diary of a member of this Field Ambulance, Captain Alan Watson, Dental Officer, AAMC, provides a unique illustrated view of the essential and difficult work of the 2/4th Field Ambulance. The 2/4th Field Ambulance functioned in a similar fashion to a current day ADF role two (enhanced) deployable hospital, providing initial wound surgery close to the battlefield whilst being mobile and capable of redeploying quickly to minimise evacuation times over the mountainous jungle terrain as the campaign progressed.

In his Kokoda campaign, Captain Alan Watson demonstrated the vital importance of deploying a dentist to provide rapid and local care for soldiers' dental pain, dental disease, and mouth and jaw battlefield wounds. Dental pain, disease and injury not only reduce soldier performance and oral function, they lower morale. The versatility of deployed dental officers was illustrated when Captain Watson was multitasked into two additional essential roles while still performing his dental duties. In the absence of an anaesthetist for the general surgeon, Captain Watson was trained in the field to administer general anaesthesia for battle casualties, and performed 173 general anaesthetics for wounded soldiers, often under hurricane lamp and ankle deep in mud. Captain Watson also served as an aerial evacuation officer, and in one day alone arranged the aerial evacuation of approximately 400 casualties.

Events of the campaign of the 2/4th Field Ambulance are described in relation to current day principles of combat health support. The valuable and timeless lesson from the Kokoda campaign of Captain Alan Watson is that immediate high quality oral care by ADF dental teams who are capable of providing battlefield wound care has always been essential for our deployed Australian soldiers.

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Field Ambulances served as the deployable hospitals for the Kokoda campaign, as the nearest general hospital was at Port Moresby. The 2/4th Field Ambulance took over as the lead medical unit for the later advance phase of the Kokoda campaign from October to December 1942, serving the health needs of the two frontline infantry brigades. The other medical units deployed for the Kokoda campaign were the 14th and 2/6th Field Ambulances for the initial advance to Kokoda in July, and the fighting withdrawal phase of August to September. They then served mostly as rear units for the second advance phase behind the 2/4th Field Ambulance (after fostering in this fresh field ambulance), as their members were by then both physically and mentally exhausted[1,2,3,4].

The original war establishment for the 2/4th Field Ambulance was 12 officers, 225 other ranks and 57 Army Service Corps personnel. With the problem of adequate resupply for the Kokoda Campaign, it was stripped down to 12 officers and 88 other ranks. Of crucial importance, it had a general surgeon and surgical team attached for the campaign[1]. Indeed, the 2/4th Field Ambulance had a comparable casualty care role to today's role two (enhanced) deployable Army hospital (as defined by the Commanding Officer, 1st Health Support Battalion, in his lecture on role2(e) health capability in March 2009), except for the key difference that early evacuation was not initially possible and the Field Ambulance was forced to hold hundreds of seriously wounded and sick patients for up to two months before aerial evacuation was introduced[1,3,4].

The roles of the 2/4th Field Ambulance included triage and resuscitation; initial wound surgery for battle casualties and further surgery; nursing ward care for battle casualties and acutely sick patients; preparation for evacuation of casualties along the Kokoda track; establishment of multiple aid posts along the track for care during evacuation of the walking wounded, as well as primary health care, emergency dental care and environmental health support. Their shelters

were tents or native huts. As an example of the heavy surgical workload, the surgical team while at Myola One, operated day and night with ten major operations and up to five additional less serious cases in twelve hours. They worked up to 36 hours continuously in the operating theatre and performed up to a total of 240 operations in ten days. The surgical team tackled all branches of surgery. The surgeon at Myola One was Captain Douglas Robert Leslie, from Victoria. Later in the campaign, Captain Harold Gatenby took over as surgeon with Douglas Leslie then operating with the 2/6th Field Ambulance[1,2,3,4].

Captain Alan Oliver Watson was the sole Dental Officer for the 2/4th Field Ambulance. Army dentists have provided care for our soldiers very close to the front lines since Gallipoli in World War One, where a British Medical Advisory committee found that up to 54% of soldiers had acute dental problems[5]. During the eleven weeks of his Kokoda campaign, Alan Watson treated 208 dental patients including 238 tooth extractions, 74 fillings, 19 cases of "trench mouth" and several facial fractures[1,2]. If his emergency dental care was not available, then it is possible that up to two hundred soldiers would not have been fit for duty (or at least had their performance adversely affected), in a campaign where relatively small troop numbers in battle meant every extra fit soldier and officer could make a difference.

In addition to his dental care role, Alan Watson was appointed by his Commanding Officer LTCOL Arthur Hobson as unofficial photographer for the Field Ambulance, utilising his own and LTCOL Hobson's German Leica cameras[1,2]. His photography which illustrates this article provided a unique perspective of the significant medical aspects of the Kokoda Campaign.

By 1942, Alan Watson was already an experienced wartime dental surgeon having served in the Syrian Campaign in 1941, after joining the Army in 1939. Alan Watson was twenty five years old in 1942, and was a graduate of Sydney University with Honours in 1938 and represented the University in tennis and boxing. Alan was six feet tall with reddish brown hair, brown eyes, fair complexion and slim build. Alan has been described as a gentle person, quietly firm, with a lifelong love of music and photography. He commenced in rural private dental practice in 1939. He married Nancy Sharp in March 1942[1,2].

In an early example of multitasking personnel to ensure adequate coverage of key clinical roles, LTCOL Hobson arranged for Alan Watson to receive a short concentrated course in the administration of general anaesthesia by the medical officers of the Field Ambulance at the start of the campaign. This was in case future events resulted in insufficient medical officers available for this role. This foresight proved invaluable in improving the rapidity and magnitude of casualty care. In nine weeks, Alan Watson performed 173 general anaesthetics for wounded soldiers[2].

Alan Watson was also multitasked later in the campaign as plane loading officer for aerial evacuations which were pioneered in the Kokoda campaign. He personally organised the aerial evacuation of 750 battle casualties and the sick during the campaign.

While the Field Ambulance was still moving up the track towards the frontline in early October, the first operation on a soldier with a fractured femur from a gunshot wound was carried out at Uberi, at night and under a single hurricane lamp by their surgeon Douglas Leslie, with Alan Watson receiving his first practical lesson in general anaesthesia from Captain Alan Day, Medical Officer (MO). The anaesthetic agent was ether from a bottle first issued to an AIF Field Ambulance in France in 1918. The operating table was a makeshift piece of bush handicraft made of local saplings. The casualty had been carried back from the frontline over three days by "fuzzy wuzzy angels", an indigenous carrier team[1].

As an example of the intensity of the fighting later in the campaign, 200 battle casualties were admitted in just twenty four hours from 1800 hours on 6th December, with not one empty stretcher left at the Main Dressing Station (MDS). Just 42 staff of all ranks were available for duty from the 2/4th and 2/6th Field Ambulances. Such casualty surges led to LTCOL Hobson requesting a second surgical team[1,2].

In regard to the types of wounds, limb wounds were the most common with one notable observation being "a really serious problem was lack of control of the femoral artery (haemorrhage) by tourniquet." Other common wounds were chest (often being sucking chest wounds), abdominal wounds (which often required transfusion) and head wounds. It was also found that buttock wounds were misleading and often had concomitant injuries involving deeper structures. Gas gangrene comprised 4.5% of battle casualties and for these the "value of surgical excision" was emphasised by the surgeons. It was found that severe wounds were usually caused by mortars and mountain guns while the small (.22) calibre, but high velocity Japanese bullets "caused little fragmentation" in wounds[1,2,3].

In regard to resuscitation, it was noted that "severe degrees of shock were not uncommon" and blood transfusions included whole blood and serum. Of possible interest to current day debates, Field Ambulance members and soldiers provided a "walking blood bank". There was no x-ray capability. A pathology service only became available very late in the campaign and this enabled malaria testing to commence[1,2,3].

Treatment of the sick from tropical diseases usually comprised 50% of hospital admissions or more. For example, on 8th November there were 52 battle casualties and 205 sick ward patients admitted, suffering from diseases such as malaria, dysentery, skin diseases, fatigue and exhaustion, typhus and respiratory diseases[1,2,3] .

By late November, the Field Ambulance (comprising an MDS and a series of aid posts) was providing care for approximately 750 to 800 wounded and sick patients stretching from the frontline back to Wairopi (with the MDS at Soputa singlehandedly caring for 450 patients with sixty staff). There were still great shortages of medical stores, cooking gear and shelter even at this late stage of the campaign. At this time, four American Medical Officers from the 126th Casualty Clearing Station volunteered their services and "provided great help"[1]. They also provided ether, the new Pentothal anaesthetic agent and dressings "without which we could not have carried on"[1]. The first American battle casualties underwent surgery at the Field Ambulance MDS on 22nd November[1,2,3] .

Important features in general for the Kokoda Campaign were difficulties from the terrain (jungle, mountains, mud, swiftly flowing rivers and streams), weather (both the heat and cold,and torrential rain) and tropical diseases, which made for great difficulties in adequate communications, transport, resupply and maintenance of soldier fitness. In fact, General Vasey, in relating the difficulties that his soldiers faced, described the Kokoda campaign as jungle warfare and mountain warfare combined[7]. Specific casualty care problems for the Field Ambulance from these adverse conditions included difficulties with medical evacuation, insufficient resupply of medications, dressings and food, lack of adequate shelter and hospital equipment, inadequate staffing levels for the tremendous surgical and nursing workload, staff health maintenance due to severe tropical diseases and lack of medications for preventable illnesses, and maintenance of morale and performance due to these demanding conditions. For example, important and continuing specific medical shortages included bandages and dressings, essential drugs, anaesthetic agents, tents, stretchers, sutures and sterile water. Even with aerial resupply drops by low flying aircraft for these shortages, around 50% of supplies were still lost in these drops (often into the jungle or damaged), and losses were even greater (up to 80%) until medical supplies were better packaged to survive the drops[1,2,3].

It is important to understand the way the Field Ambulance functioned when confronted with these combined obstacles. WO2 L. Thompson, in an article published in SALT in March 1943, stated the Field Ambulance "comprises the shock troops of the AAMC and must be capable of instant movement and change. In the New Guinea campaign there was no question of leaving the field ambulance behind. It had to and did keep up with the battle troops."[6]. These rapid movements gave the Field Ambulance the vital advantage of proximity to the battlefront which greatly shortened evacuation times and consequently saved many more lives and limbs.

Alan Watson in his 1991 video commentary stated that the Field Ambulance "had to and did prove equal to any circumstances. The revolutionary conditions imposed on us gave rise to a new leap-frog movement. The unit was spread out along the track in a series of posts"[1]. The advance aid posts near the battle front guided the wounded and sick back to the MDS and surgical team of the Field Ambulance for treatment and surgery. For evacuation behind the MDS, there were small aid posts with nursing orderlies at intervals back along the track to care for the walking wounded who, during the advance phase, had to trek back to Owers Corner near Port Moresby (where the transport chain began) until Kokoda and its airstrip were regained[1,2,3]. In fact, the only wounded that could be evacuated before the airstrips were retaken were those who could walk, hobble, or use improvised crutches going from stage to stage, hobbling painfully and arriving at the aid post drenched and exhausted for a night's rest. During this later advance phase of the campaign, bearer parties were too urgently required at the front and for resupply to be spared for such a long carry back to Owers Corner. The evacuation distance along the track was not measured in miles or yards but in time, and the time varied whether in the dry or in the wet weather. Rain could easily double the time needed to go the required distance. Even for a fit soldier, the distance from Myola to Owers Corner could not be covered in less than four or five days. Indeed, a distinctive feature of the Kokoda Campaign was the self evacuation of the walking wounded along the track back to base. This could take them up to several weeks[1,2,3].

A unique feature of the Kokoda campaign was the crucial role of the indigenous carriers, affectionately nicknamed the 'fuzzy wuzzy angels' by the Australian soldiers. These indigenous carriers of both severely wounded soldiers and for the transport of critical supplies, were vital in sustaining the entire Kokoda campaign. Alan Watson in his video commentary described them as "native boys, both local and from New Britain, employed by the army via the Australian and New Guinea Administration Unit and we can't speak highly enough of them. Their courage, devotion, physical endurance and perseverance became legendary……without this assistance we would have been defeated well before we achieved victory"[1]. As well, all of the medical equipment of the Field Ambulance had to be of sufficient light weight to be transported by the fuzzy wuzzy angels over the track[1,2,3].

Aerial evacuation was forged in this phase of the Kokoda campaign by trial and error. The first aerial evacuation was carried out at Myola on 27th October with the evacuation of a casualty with an eye wound. The crash of three aircraft on landing at the difficult Myola airstrip together with the initial allocation of too few aircraft for aerial evacuations led to the abandonment of aerial evacuation (only 37 casualties were evacuated) until the Kokoda airstrip was retaken. After this, many hundreds of wounded and sick soldiers were evacuated by air. Alan Watson was first ordered by LTCOL Hobson to act as Plane Loading Officer for casualty evacuations at Kokoda airstrip from 5 to 16 November. He organised the evacuation of 350 casualties over these eleven days, with the best two days resulting in 111 and 99 casualties evacuated. Later at Popondetta airstrip, he demonstrated great ingenuity when he was ordered to evacuate casualties and the sick with the upmost speed by any means. Allied transport pilots often declined to fill their returning empty planes with casualties, while the RAAF pilots always filled their planes to capacity. He persuaded Allied pilots by bartering Japanese helmets and rifles as payment (one rifle equalled ten to twelve evacuations, one helmet equalled two evacuations). This resourcefulness resulted in the transport of 400 Australian casualties and sick on 27th November alone[1,2,3]. This enormous number of casualty evacuations was just prior to a Japanese air raid on the Field Ambulance later that day.

At 1630 hours, on that same day, thirteen Japanese Zero fighter bombers in three waves strafed and bombed the MDS of the Field Ambulance which had a large Red Cross ground sign clearly visible. The wards and kitchen area were badly hit, and the Q store and dispensary were completely gutted by fire. Among the twenty two killed were seven staff including two Medical Officers, Majors Ian Vickery and Hew McDonald, the others being sick malaria ward patients hit by machine gun fire. Over fifty patients and ambulance personnel were wounded. The Official History “Australia in the War of 1939–1945” painted a grim picture: “It was a scene of utter devastation ….. in a few minutes a busy hospital was transformed into a miniature battlefield”[3]. The Field Ambulance RSM WO1 Kim Williams (who later received a Mention in Despatches) was outstanding in arranging the clearing of the wounded, sick and dead. While returning from their aerial evacuation duties at Popondetta airstrip, Alan Watson and Captain Follent, MO, were repeatedly machine gunned whenever their jeeps appeared in the open kuni grass patches on their way back to the MDS. Despite the losses, after relocation, the Field Ambulance was again admitting casualties for care the next day[1,2,3].

By mid December, the 2/4th Field Ambulance members were physically and mentally exhausted or sick from malaria and the replenished 14th Field Ambulance took over their role, assisted by key personnel of the 2/4th Field Ambulance in each department. On 16th December, LTCOL Hobson and Alan Watson walked to Gona to have the satisfaction of completing the whole trek to the coast. In late December, the entire Field Ambulance was flown to Port Moresby and embarked by sea for Cairns in mid January[1,2,3].

In 1943, LTCOL Arthur Hobson was awarded the OBE (Military Division) for being “personally responsible for good service rendered by his Field Ambulance …. during the advance from Nauro to Gona”. Mentioned in Despatches was Captain Alan Watson “for having rendered gallant and distinguished services”, as were Captain Douglas Leslie, and WO1 Kim Williams, Major Ian Vickery (posthumous) and Major Hew McDonald (posthumous). The essential role of military dentistry was recognised formally in 1943 with the establishment of the Australian Army Dental Corps[1,2,3].

Alan Watson suffered malaria for a further three years as well as dysentery, with his weight plummeting to under 40kg. With his life long partner Nancy he had three children. He was promoted to Major and was discharged in 1944. He commenced practice with his father at Macquarie St in Sydney. Alan was a pioneer in innovations in the dental care for cerebral palsy patients for thirty years; he established the dental operating theatre of the Spastic Centre Mosman; he was a lecturer at the Universities of Sydney and Illinois; he was awarded an honorary life membership of the Spastic Centre of NSW and he was awarded a Doctor of Dental Science in 1955. He retired in 1985 and was made a Member of the Order of Australia. He was

Captain Alan Watson providing emercency dental care. Demonstrating foresight, he selected the items most likely to be used in dental emergencies and aimed to have them last for several months. This was quite prescient as there was no replacement of dental instruments or medications such as local anaesthetic for his entire campaign. Note that General Vasey had recently ordered that epaulettes be worn again. AWM.

the author of many publications and edited the book "History of Dentistry in NSW 1788-1945". He produced his Kokoda War Diary video in 1991[2]. Alan Watson and his surgical colleague Douglas Leslie remained life-long friends. Alan Watson, AM, BDS, DDSc, FRACDS, FICD died in 1993. Nancy died in 2009.

Conclusion

In conclusion, with the benefit of hindsight, it appears there was a lack of appreciation by the higher command at the time of the many great obstacles in provision of effective medical care in a combined mountain and jungle tropical campaign. As one example, early in the campaign, the Field Ambulance members had to rely for their adequate malaria suppression on quinine supplies captured during the Japanese retreat[1].

These preparation shortcomings led to the need for effective improvisations, much adaptability and considerable ingenuity by the medical soldiers of the three Field Ambulances who provided life-saving solutions to the unique casualty care challenges of the Kokoda campaign. The solutions provided by these Field Ambulance soldiers and the Brigade Headquarters staff to the challenges posed by the Kokoda Campaign included:

- "Leapfrog" Field Ambulance movements to enable rapid casualty care
- Holding non-walking casualties long term in wards
- Self evacuation of the walking wounded

Captain Douglas Leslie, surgeon, applies plaster to a soldier's broken left leg. Assisting Captain Leslie is Major Henry Selle (MO) from the 2/6th Field Ambulance. To support the broken limb during the procedure, a makeshift frame of rough wooden poles has been set up at the entrance to the tent that serves as the operating theatre. AWM.

- Aerial supply drops of urgently needed essential medical supplies
- Pioneering the use of aerial casualty evacuation and the related vital role of possession of airstrips
- Field training and multitasking personnel for staff shortages in key clinical roles such as providing general anaesthesia and aerial evacuation organisation
- Improvisation of hospital equipment from local materials such as saplings for operating theatre tables, splints and even boiled water from clean mountain streams when sterile water for intravenous use became unavailable
- Location of medical liaison officers at Brigade Headquarters which enabled more efficient casualty care
- Lastly and most importantly, the vital role of the Fuzzy Wuzzy Angels in resupply and casualty evacuation cannot be over emphasised.

Without a doubt, a study of the Kokoda campaign records of Captain Alan Watson gives a great insight into the importance of always deploying an ADF dental team as part of future ADF deployments to eliminate avoidable loss of soldier performance and morale caused by oral problems. For example, in the Boer War when the Australian volunteer military units did not deploy any dentists, 25% of all evacuations from the front line were due to dental problems[8]. Recent deployments such as by the US Army in Iraq and Afghanistan have revealed new dental problems related to stress and diet that can debilitate soldiers if there is not rapid access to dental treatment[9]. Alan Watson's campaign well illustrates the importance of personal flexibility and the importance for commanders to recognise and utilise their soldiers' skills in different roles.

In conclusion, many of the modern principles of combat health support were displayed in the Kokoda campaign of the 2/4th Field Ambulance including: mobility, proximity, flexibility, responsiveness, simplicity, continuity of care, and economy of effort[10]. Of most importance, the timeless military medicine qualities of endurance, courage and care were magnificently exemplified by the members of the 2/4th Field Ambulance and their two companion Field Ambulances in their Kokoda campaign.

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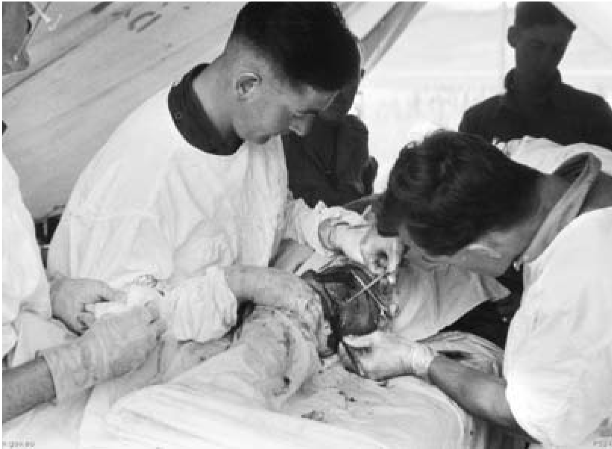

Myola October, 1942. Major Henry Selle (centre) a Medical Officer serving with the 2/6th Field Ambulance, assists the surgeon Captain Douglas Robert Leslie (right) in an operation to repair a wound to the left thigh in an Australian soldier. In the background (right) is the anaesthetist for the operation, Captain Alan Watson, Dental Officer. AWM.

Imita Ridge, Papua, October 1942. Two indigenous carriers and a member of 2/4th Field Ambulance slowly climb the so-called 'Golden Stairs' towards Ioribaiwa. Each step was battened at its edge by a rough log which was sometimes broken and often slippery with a coating of mud. In climbing the stairs, soldiers had to lift their leg over the log and put their foot down on the step behind in what was frequently a puddle of mud and water up to six inches deep. AWM.

The CO Lt Col Arthur Hobson (centre) in discussion. Their dress shows evidence of the unit's lack of preparedness for the jungle campaign ahead along the Kokoda Track, with Captain Alan Day (left) wearing puttees as used in the deserts of North Africa, Sgt Watt (right) wearing gaiters for normal dress wear and Lt Col Arthur Hobson, CO, (centre) having neither puttees nor gaiters. AWM.

Myola One, October 1942. Informal outdoors group portrait of members of the surgical team at the Main Dressing Station of the 2/4th Field Ambulance. Myola consisted of dry lake beds which provided the best environment of the whole campaign. Left to right: Staff Sergeant Stanley Clark, senior theatre orderly; Captain Alan Oliver Watson, Dental Officer and anaesthetist; Captain Douglas Robert Leslie, surgeon; Private W. McBean, theatre orderly; Pte Gribble, dental technician; Pte Finlay, the CO's batman. The men are standing in front of the tent that serves as the operating theatre. AWM.

Templeton's Crossing area, November 1942. A team of native stretcher-bearers, affectionately known as 'fuzzy wuzzy angels', carries a wounded Australian soldier through difficult jungle terrain along the Kokoda Trail. The fuzzy wuzzy angels needs were cared for by CAPT Geoffrey Vernon, the most significant Medical Officer of the Kokoda campaign, who also provided care for the 39th Battalion. It has been said that the only difference between Captain Geoffrey Vernon and Private Simpson Kirkpatrick of Gallipolli was that Vernon did not have a donkey. AWM.

Jumbora area. 16 December 1942. Two teams of native Papuan stretcher-bearers carry sick or wounded Australian soldiers along a muddy section of the road between Soputa and Gona. Plodding through the mud on the other side of the road (right) is Lieutenant Colonel Arthur Francis Hobson, CO of the 2/4th Field Ambulance. AWM.

The operating theatre at Myola One, October. The operating table is a makeshift piece of bush handicraft made from trees. A tent f y has been used in the improvisation of a makeshift operating theatre. During operations, a blanket was hung at each end of the theatre to enclose it. The surgical equipment was most primitive: a Primus stove of Syrian origin, assorted tins for sterilisation, 2 hurricane lamps and 2 electric torches for illumination when night fell. AWM.

Kokoda, November. USAAF Stinson Vigilant ambulance aircraft prepares to take off from the airstrip. The aircraft is evacuating two sick or wounded Australian soldiers to Port Moresby from the 2/4th Field Ambulance. The Stinson was capable of carrying two patients, one lying and one sitting. A Red Cross sign indicates the Stinson's medical function. The nose bears a tally sheet of smaller crosses which records the number of medical evacuation missions undertaken. AWM.

Myola One, Papua, October 1942. At the Main Dressing Station of the 2/4th Field Ambulance, members of the unit's surgical team work in the open as they apply plaster to the broken arm of an injured soldier. Left to right: Major Ian Vickery, a Medical Officer, who is standing with his hands in his pockets and watching the procedure; Private Downey (with back turned) who is supporting the patient's arm; the patient himself; Captain Douglas Leslie, the surgeon (in surgical gown), who is applying the plaster; Pte W. McBean (at rear), a nursing orderly, who is supporting the patient's back. Standing on the ground in front of the group are a jerry can marked with a large 'W' to signify water, a canvas bucket full of water, several rolls of dressings sitting on a box marked 'USS', and two tins of plaster of Paris. The surgical team not infrequently grabbed passers-by to provide some sort of help in such procedures. AWM.

Soputa, Papua, 27 November 1942. Staff members of 2/4th Field Ambulance gather together for identification the dead bodies of unit members and patients killed when Japanese Zero aircraft, attacking in three waves, strafed and bombed the unit's Main Dressing Station. At the same time, the Japanese aircraft attacked 7th Division Headquarters and the US Army's 126 Combat Clearing Station which were located nearby. The bodies of the dead men have been wrapped in blankets. AWM.

Private Ron Weakly of the 39th Battalion undergoing an operation for severe facial wounds. This became a famous picture and first appeared in 'Pix' and has been published many times since. It is the Soputa Two Main Dressing Station. Left to right Colonel Norris ADMS; Major Ackland, surgeon; Captain Middleton; CO Lieutenant Colonel Hobson; Captain Alan Watson, anaesthetist; and Major Munroe Alexander, DADMS. Note the carpet of mud. AWM.

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Photo acknowledgments

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