

Directors of Clinical Services Meeting

Réunion des directeurs des services cliniques



Developing a Trauma Management Upskilling Plan for The Pacific

The management of orthopaedic trauma (fractures and other musculoskeletal injury and degenerative conditions) varies greatly in the Pacific Island countries. Most Pacific Island countries lack adequate numbers of trained orthopaedic surgeons. The World Health Organisation (WHO) lists open long bone fractures as one of 3 Bellwether procedures.

To date general surgeons have been attempting to manage orthopaedic trauma with limited training and skill and even more limited equipment. This has led to poor outcomes and a significant burden of lifelong disability. The Pacific Islands Orthopaedic Association (PIOA) has been providing training in orthopaedic trauma for 10 years with 5 graduates and a further 20 students at various stages of training.

There is an urgent need to establish an adequate orthopaedic trauma workforce with adequate minimum equipment to provide trauma orthopaedic services for the population of the Pacific Island countries.

1. BACKGROUND

To date orthopaedic training in the Pacific has been limited to 2 programs (one at University of Papua New Guinea (UPNG) in Port Moresby and one at Fiji National University in Suva). The limitation of these programs has been that doctors have to leave their home for up to 4 years. The loss to their home country and hospital and the separation from their family and supports has been a significant barrier. Meanwhile Suva and Port Moresby gain a free worker. The programs have lacked a detailed orthopaedic curriculum and have been more based on time spent. There has not been a priority on more modern treatment methods.

2. PROGRESS AND ACHIEVEMENTS

2.1 Training:

PIOA commenced in 2012 and the training program commenced in 2013 with 3 trainees from Solomon Islands, 1 from Samoa (the author) and 1 from Tonga. The PIOA program consists of 12 modules each of 7-10 days duration. For the first 4 years of the program 3 modules were held each year. Trainees were able to live and work in their home country and travelled for the module which was held in Solomon Islands. From 2016 modules were also held in Apia in Samoa (2016, 2017, 2018) Lautoka in Fiji (2017), Madang in PNG (2018, 2019) Kundiawa in PNG. During the pandemic we have continued with once-a-week sessions online each Sunday. We will recommence in person modules with the first in Suva in September 2022. To date we have 5 graduates and 20 trainees currently.

Implant supply:

PIOA has assisted hospitals with advice and supply of instruments and implants. These are purchased from suppliers in India or China. The quality has been vetted and they are available at a significant discount to purchases through Australia. The benefit of this lower cost is that they become affordable for Pacific Island countries with limited health care budgets.

See below for description of PIOA C arm digital XR for use in Operating Theatre.

3. CHALLENGES

3.1 Supervision

Our trainees work in a variety of settings with varying levels of supervision and access to equipment. For isolated trainees, supervision is limited to supervisory visits by visiting teams who work alongside the trainee. Regular ongoing support and teaching is provided using Viber and trainees contact PIOA for advice when dealing with complex or unusual problems. PIOA aims to improve this by setting up

more regional training centres (Lae and Kundiawa in PNG, Suva and Lautoka in Fiji, Apia in Samoa and Honiara in Solomon Islands where trainees could be based for their second or third years.

3.2 Implants

There is a lack of adequate implant supply throughout the Pacific Island countries. In the past hospitals have relied on donations. This has meant that supply is haphazard and inadequate. Even when PIOA supplies low-cost implants many hospitals have been very slow to arrange payment. With data on the workload (number of open and closed fractures per year) it is relatively easy to plan and order adequate equipment. For a large regional centre looking after a population of 200,000 people per year, replacement implants would cost approximately \$US 20,000 (less than 10c per person per year).

3.3 Equipment

To provide an adequate orthopaedic service we require appropriate implants and radiology facilities. Very few hospitals have an adequate image intensifier. Intra-operative XR is an essential part of modern orthopaedic treatment. The initial cost for all the sets listed would be of the order of US\$ 20,000 plus a further \$US20,000 for implants. This includes all sets listed in the Recommendations for governments paragraph. In addition, obtaining a low cost digital XR C arm would cost \$US3,500 as a one-off purchase. (See below)

PIOA has recently developed a low-cost C-arm digital x-ray system that can provide the function of an image intensifier C arm (usually \$US100,000) at a cost of \$USD35,000 – using a portable digital x-ray generator and digital receiver and a mechanical C arm. This robust device needs minimal maintenance and if service is required only a small part of the device (9kg or 4kg) needs to be transported. There are no wires to be damaged by humidity or rodents.

4. FUTURE DIRECTIONS

4.1 Recommendations for governments:

4.1.1 Training

To date, training by PIOA has been funded by donors. At present the cost is \$USD150,000 per year (airfares, accommodation and support for trainees and lecturers for 6 weeks a year). All lecturers provide their time for free. There is a need for SPC and government to step up and accept the costs of training their own staff. This is a cost of \$USD6000 per student per year.

4.1.2 Equipment – minimum needs for regional and district hospitals

If we in the Pacific Island countries are to meet the WHO targets for bellwether procedures, we need to ensure that every district hospital has a doctor capable of providing basic orthopaedic care. This would

include the management of closed fractures and the debridement and stabilisation of open fractures (preferably with an external fixator or at minimum with a cast). This means every hospital needs access to x-ray services and plaster supplies and a simple ex-fix set. The cost for disposable implants (threaded pins) for 1 patient ex-fix is as low as US \$10 (with the full set including reusable clamps and bars at \$US 100).

Minimum trauma systems for regional hospitals include small fragment and large fragment fixation sets, Intramedullary (IM) nail sets, Titanium ElasticNails (TENS) nail sets and external fixations sets and specialised sets (hand, wrist), locking plates (distal femur, tibia, humerus, elbow and wrist), Cannulated screws (4mm, 7mm), Hemiarthroplasty for subcapital fractures and bone cement. Regional hospitals also require an Image intensifier or the PIOA designed equivalent digital x-ray C arm (1/3 of the cost and much more robust).

Once the trauma needs of our citizens are being met then we need to consider how we can provide suitable reconstructive services such as joint replacement. Some countries (such as Fiji) have been sending their citizens to India for such surgery at much greater cost and with significant risks such as the introduction of methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant *Enterococci* (VRE) multi-resistant organisms in returning patients

4.2 Recommendations for development partners

PIOA will be performing a detailed study in partnership with the Harvard Global Orthopaedics Collaborative to assess current workload and manpower and future needs.

PIOA will continue to advocate for quality orthopaedic trauma services so that all citizens of Pacific Island countries have the opportunity to make the best recovery possible following accidental or traumatic orthopaedic injury.

References:

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2. O'Neill, K.M., Greenberg, S.L.M., Cherian, M. *et al.* Bellwether Procedures for Monitoring and Planning Essential Surgical Care in Low- and Middle-Income Countries: Caesarean Delivery, Laparotomy, and Treatment of Open Fractures. *World J Surg* 40, 2611–2619 (2016).
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