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INTRODUCTION

Tan Tock Seng Hospital's Foot Care and Limb Design Centre (FLC) which provides Podiatry and Prosthetics & Orthotics (P&O) services, is the only centre in Singapore with a specialised workshop that is equipped with onsite fabrication capabilities to manufacture and assemble customised prostheses. In concordance with the opening of the new FLC building in August 2013, the centre's operational workflow was relooked and streamlined so as to improve patient care.

BACKGROUND

In 2012, there was a 6.73% increase in P&O workload in the centre. Subsequently, a further increase of 16.78% in 2013 was reflected. Workload growth is cumulative year on year as patients with amputations would require artificial limbs for a lifetime. Given that each artificial limb only last for 3 to 5 years, a new limb will have to be fabricated by our Prosthetists every few years. With this expected growth, better operational efficiency and resource management was needed to ensure timely delivery of these customised prostheses.

The increased workload led to a longer waiting time from point of referral to an actual P&O consultation. 51.44% of P&O patients in 2012 were seen within 3 weeks whilst the rest waited for more than 3 weeks. The waiting time increased in 2013, with only 34.15% of patients being seen within 3 weeks and the remaining waited for more than 3 weeks to receive their prosthetics.

OBJECTIVES

Develop a streamlined Workshop Management System (WMS) via the use of technology and lean methodologies to improve efficiency:

- Reduce average Turn Around Time for artificial limb to be completed
- Reduce manpower wastage from unnecessary inventory search
- Improve storage space for expected increase in number of jobs
- Create system to monitor material wastage from reworks and individual staff performance
- Improve staff satisfaction via improving work process efficiency

METHODOLOGY

In-depth interviews and focus group discussions were conducted by a multi-disciplinary workgroup of Technicians, Prosthetists and Orthotists and the Operations team to analyse the problem.

The Kaizen 6S LEAN methodology was used in redesigning the current workflow and remodelling of the existing storage shelving for the WMS. The workgroup also identified and evaluated several software solutions. Using a matrix of evaluation criteria (costs, ease of use and sustainability), Microsoft Access was selected as a cost effective and user-friendly software solution to be used for WMS.

A carefully designed Microsoft Office Access inventory management software system was created, and effectively captured the necessary data for statistical analysis and highlighted areas for improvement, including staff performance. The introduction of the software system helped phase out the erroneous paper-based recording system which was previously recorded through the centre's handwritten logbook, as data was input and tracked into an electronic database recording system.

RESULTS

The results collected from January to July 2014 created the first official baseline statistical analysis for the centre's workshop. The average job Turn Around Time in the workshop was proven to be 2 days instead of the estimated 5 days. This led to better management of job distribution that can be easily monitored through the system. The WMS allows close monitoring on material wastage by reviewing jobs done and purchasing patterns.

INCREASED TIME SPENT ON PATIENT CARE:

40% reduction in time (from 10 minutes to 6 minutes) spent on tracking and tracing for prosthesis by Prosthetists and Orthotists, allowed more time allocation towards patient care. Patient Service Associates were also relieved off the tedious role of handwritten job entries, maximising time spent with patient at the counter.

RESULTS

IMPROVED PERFORMANCE TRACKING AND RESOURCE MANAGEMENT:

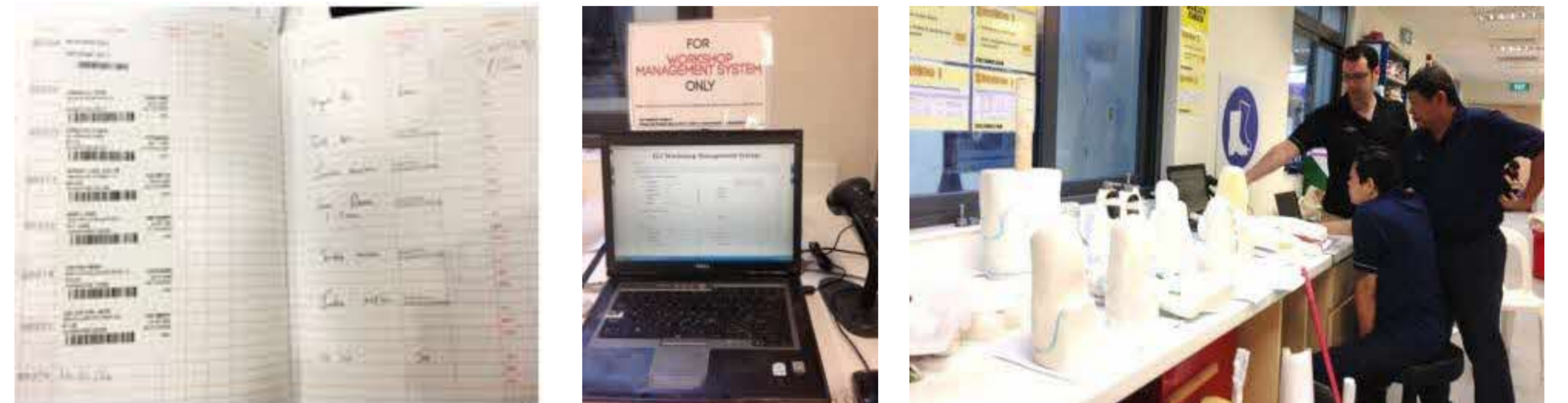


Fig 1. (left to right) Handwritten Job record book used (1994 – 2013) before implementation of the Workshop Management System. Two weeks training were done for all senior Technicians.

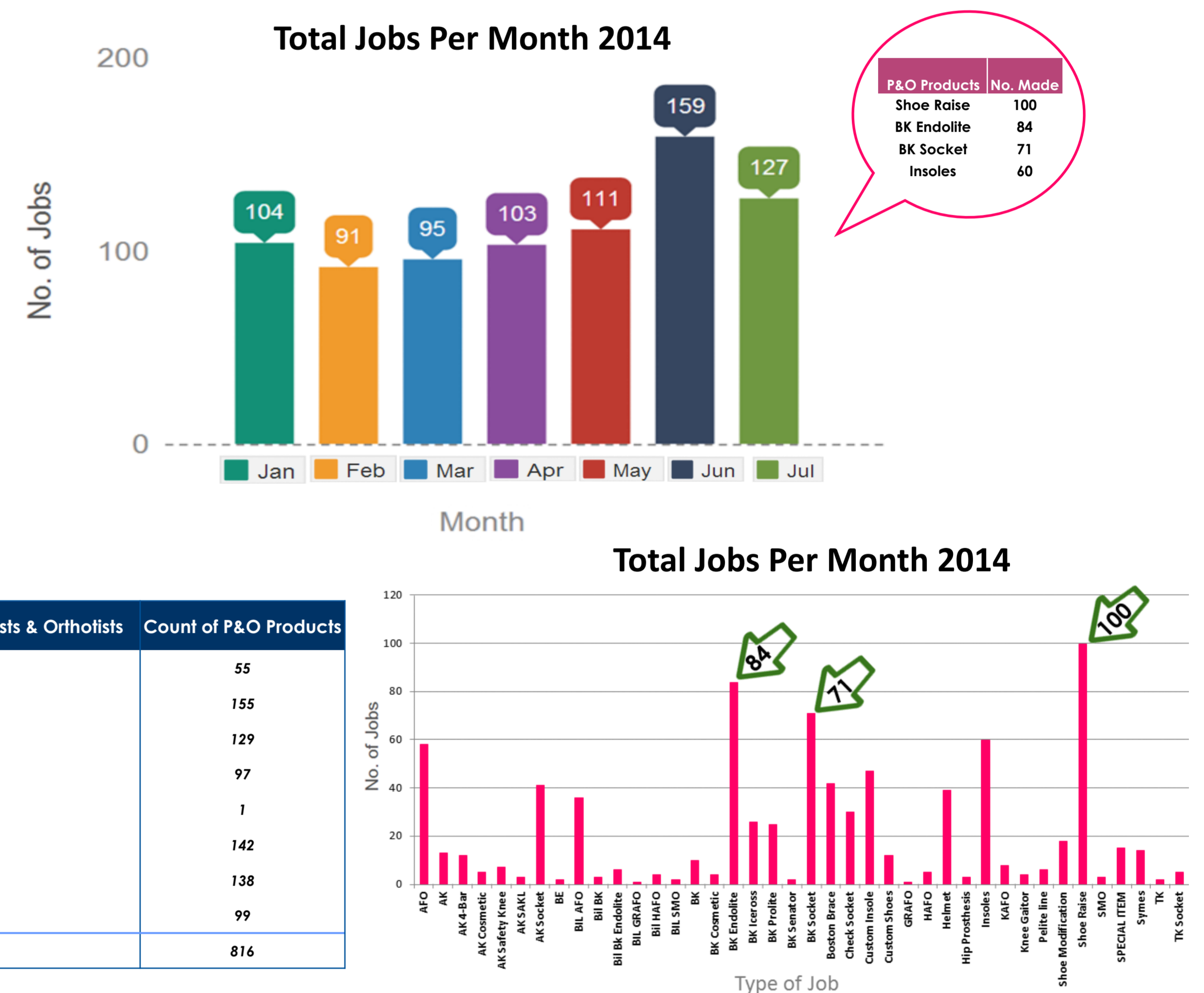


Fig 2. (Top to bottom) Performance indicators on number of jobs made, type of jobs made and individual performance allow for better planning of human resource allocation and materials management for the centre.

INCREASED WORKSHOP STORAGE SPACE:

The improved shelving system increased workshop storage space by 14.2%, allowing accessibility of locating and maintaining the prosthesis. Time taken to retrieve products was reduced from 10 minutes to 6 minutes.



Fig 3. (Left to right) Modification of the current shelving structure created more organisation and eased inconvenience caused by searching for prosthesis. Increase in workshop storage space by 14.2%

INCREASED STAFF SATISFACTION:

Staff satisfaction increased, with consensus that the WMS is a valuable tool that effectively improve the workshop workflow and helped to organise inventory and reduce errors and time wastage in needless inventory searching.

CONCLUSION

The team learnt that change management is crucial in managing resistance by older Technicians to adapt to the digital computer system. Constant upgrading of staff skill sets is critical for creating a more efficient workflow. This pioneering project demonstrated that a simple and low-cost intervention can rapidly turn around the efficiency and performance in the workshop, and it can further supplement the FLC Store Inventory Management system, to achieve our ultimate goal of reducing waiting time for patients and providing a seamless integration in management of both workshop and inventory requirements.