ELECTRICALLY CONDUCTIVE SILICONE INTERFACE FOR MYOELECTRIC PROSTHESES WITH SILICONE SOCKET SUSPENSION

Ian Whatmough R.T.P. (c), Shane Glasford C.P. (c), Tony Liang BASc, Jan Andrysek PhD, PEng
Holland Bloorview Kids Rehabilitation Hospital, 150 Kilgour Road, Toronto, Ontario, M4G 1R8

ABSTRACT

Silicone socket suspension technology for the upper extremity amputee has been proven to provide increased suspension and range of motion over conventional self suspending sockets. Application of silicone socket suspension has greatly benefitted clients with very short residual limbs and disarticulation level amputations. However, the use of silicone suspension sockets with myoelectric control has presented some problems, namely relating to the wear and tear on electrical control cables and connections. Managing the interface between silicone socket and hard socket without compromise to signal loss via an electrical-mechanical interface about the pin lock has been investigated, and although function was acceptable, this approach was technically complex. An alternate and potentially simple solution is the use of an electrically conductive silicone interface within the silicone socket and localized at the electrode site. To investigate the feasibility of this approach, a prosthetic socket and silicon sleeve using the conductive material was fabricated and evaluated on a single subject. Signal quality was found to be acceptable but further work is needed to assess the factors that can be targeted to further improve the signal-to-noise ratio. This approach has the potential to reduce the technical requirements in achieving usable EMG signal capture.