

PH1: Change in Visual Acuity and Contrast Sensitivity of Visually Impaired Schoolchildren Under Various Illumination Levels

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ABSTRACT

Introduction: Previous studies have shown that surrounding illumination affects visual functions such as visual acuity (VA) and contrast sensitivity (CS). **Methods:** The purpose of this study is to determine the change in VA and CS of visually impaired (VI) schoolchildren under various illumination levels and to determine the minimum illumination level for optimum VA and CS. Forty VI schoolchildren from a special school in Kuala Lumpur, Malaysia participated in this study. VA was measured using logMAR chart at a distance of 1.2m while CS was measured using Pelli-Robson chart at 1m. The surrounding illumination levels spanned over 5 octaves, and the change was in one octave step from 50 to 1600 lux. **Results:** Best corrected VA and CS of better eye improved significantly as surrounding illumination levels increased from 50 to 1600 lux (VA: $F = (2.34, 86.61) = 34.65$, $p < 0.001$; CS: $F (2.52, 93.08) = 46.83$, $p < 0.001$). VA reached maximum at 400 lux and plateau thereafter (pairwise comparisons showed no significant difference in VA at 400, 800 and 1600 lux, $p > 0.05$). For CS, maximum sensitivity was obtained at 1600 lux. However, change in CS was significant up to 400 lux only. CS continued to increase at 800 and 1600 lux but not significantly ($p > 0.05$). **Conclusion:** VA and CS improved with increased surrounding illuminance. Based on this study, the recommended minimum surrounding illuminance to achieve optimum VA and CS for visually impaired schoolchildren is 400 lux

KEY WORDS:

Visually impaired (VI) schoolchildren, visual acuity, contrast sensitivity, illumination levels

PH2: Measurement of Temperature Induced in Bone in Minimally Invasive Foot Surgery

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ABSTRACT

Introduction: There has been growing interest in the development of a protocol for minimally invasive foot surgery due to the benefits it delivers in post-operative outcomes in comparison to conventional open methods of surgery. One of the major factors determining the protocol in minimally invasive surgery is for the prevention of iatrogenic thermal osteonecrosis. The aim of the study is to look at various drilling parameters in a minimally invasive surgery setting that would reduce the risk of iatrogenic thermal osteonecrosis. **Methods:** Sixteen fresh-frozen tarsal bones and two metatarsal bones were retrieved from three individuals and drilled using various settings. The parameters considered were drilling speed, drill diameter, coolant administration and inter-individual cortical variability. Temperature measurements of heat generated at the drilling site were collected using two methods; thermocouple probe and infrared thermography. **Results:** There was a significant difference in the temperatures generated with different drilling speeds and administrations of coolant ($p < 0.001$). However, our study did not find a significant difference in temperatures recorded between the bones of different individuals and in bones drilled using different drill diameters. **Conclusion:** Administration of coolant and drilling at an optimal speed significantly reduced the risk of iatrogenic thermal osteonecrosis by maintaining temperature below the threshold level. Although different drilling diameters did not produce significant differences in temperature generation, there is a need for further study on the mechanical impact of using different drill diameters.