

Quantitative assessment of essential elements in acute and chronic wound tissues

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Wounds are likely to have existed ever since man existed. Non-healing wounds reduce the quality of life for individuals and are a significant burden upon the financial resources of the healthcare economy of the country. Wound healing is an enormously complicated process and the actual scientific mechanisms and events that take place during healing are far more complexed and dynamic than might be imagined. Essential elements, especially trace elements are believed to be pivotally important to the wound healing process. Their involvement in tissue regeneration and repair appears to be wide-ranging and the deficiencies have been reported to impair the healing process.

Thus an assessment of trace element levels in wound tissues could be beneficial for trace element based wound healing. This preliminary study was an attempt to assess whether there is any link between trace element concentrations of wound tissues and blood of patients in Sri Lanka hospitals. Blood samples and tissue samples from 50 acute wounds and 58 chronic ulcers were analyzed for concentrations of Fe, Zn, Cu, Mn, Ca, Sn, Cr, Cd and Pb using atomic absorption spectrophotometry. All the data were tested for normality by Ryan-Joiner normality test ($\alpha = 0.05$) and one-way ANOVA was done for the normally distributed data.

Results showed that blood contains significantly higher amount of Fe than wound tissues and greatly varies with the patient. Ca is somewhat stable in blood and wound tissues contain more Ca when comparing to the blood for both acute and chronic wounds. Zn concentration is higher in blood than in wound tissues except for few cases. Concentrations of Cu in wound tissues are relatively lower than that of blood of the same patient. Mn is more or less stable and contains very low levels in the wound tissue and blood contains more Mn when comparing to wound tissues. Sn, Cd, Cr and Pd were not detected by graphite furnace atomic absorption spectrophotometry.

The metal content in acute and chronic wound tissues showed that the wound tissues always contain higher amount of calcium than blood of the same patient and other element levels are lower than blood in most patients.

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