

## A CASE OF CHRONIC RADIODERMATITIS IN A DENTAL X-RAY TECHNICIAN: A RARE ENTITY

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Sir,

Dealing with diagnostic X-ray radiation may result in serious health problems, unless protection guidelines are followed. This become prevalent immediately a decade following the invention of X-ray radiation, where it had not been known that accumulative exposure to X-ray radiation may carry huge health hazard. Due to occupational accidents, radiography workers may be rarely exposed to high dose of ionizing radiation and acute radiodermatitis may develop after the exposure. After an asymptomatic period of which can last several months, poikiloderma, sclerosis, necrosis, and ulceration of the skin may be observed as clinical features of chronic radiodermatitis.

A case report of 40 year old male, working as a dental radiographer for 12 years (1996-2008) developed thickening was over skin of thumb and fingers, and blackening was over bilateral thumbs nails for 8 years. After 2 years he developed ulcers and thickening over fingers and thumbs, a dermatologist prescribed topical steroid and lesions improved with in two month but blackening and thickening didn't improve. He presented with ulceration on fingers and blackening of nails. On examination, atrophy of skin, loss of hair appendages, poikiloderma and scar was present over bilateral thumb and a nonhealing ulcer with purulent discharge over right index finger was present (fig.1 and 2). Systemic examination was with in normal limit. Histopathological examination showed a fairly

circumscribed focus of mild epidermal hyperplasia with disorderly arrangement of keratinocytes in lower half of epidermis. There was mild nuclear pleomorphism and occasionally dyskeratotic cells and mitotic figures were also seen. The stratum corneum showed alternating zones of orthokeratosis and parakeratosis which spares follicular infundibula. The dermis showed a moderately dense patchy lichenoid lymphocytic infiltrate underlying this focus [fig.3]. Topical and oral antibiotics were prescribed for two weeks. Potent topical steroids were prescribed thereafter. There was mild improvement clinically and patient is on regular follow up. We report this case because of rarity.



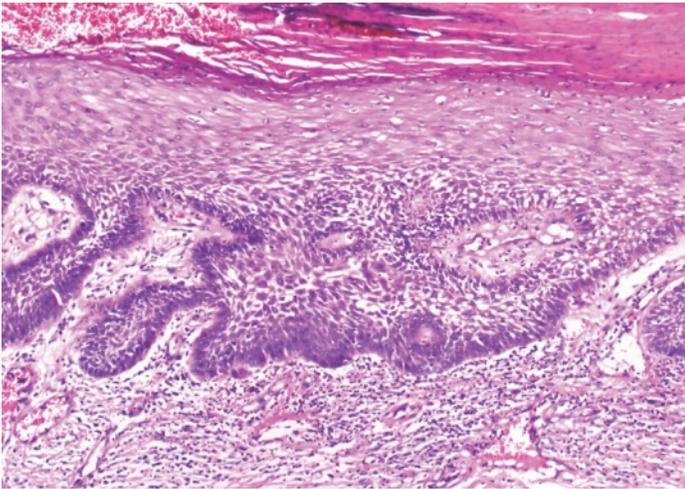
**Figure 2:** Nail and skin changes of thumb.



**Figure 1:** Clinical photograph of a technician showing ulceration of right index finger

Late skin effects can develop months to years after the exposure to radiation. The main cutaneous reactions that characterize chronic radiodermatitis are skin atrophy, fibrosis, pigmentation changes, telangiectasia, necrosis and secondary malignant skin tumours. The underlying mechanism behind chronic skin reactions is based on an extended inflammatory reaction and is prolonged for months to years afterwards. Inflammatory cytokines (e.g. IL-1 $\alpha$ , IL-6, TNF- $\alpha$ ) are responsible for this reaction. In addition, TGF- $\beta$  and platelet-derived growth factor are upregulated in irradiated skin. These cytokines enhance tissue fibrosis by activating fibroblasts and inducing synthesis of

extracellular matrix proteins and metalloproteinase, as well as the formation of telangiectasia. The prolonged inflammatory reaction induces skin atrophy and necrosis via the accumulation and activation of leucocytes at the irradiated area<sup>1</sup>.



**Figure 3:** Stratum corneum shows alternating zones of orthokeratosis and parakeratosis and dermis shows a moderately dense patchy lichenoid lymphocytic infiltrate, Mild nuclear pleomorphism, dyskeratotic cells and mitotic figures and fairly circumscribed focus of mild epidermal hyperplasia with disorderly arrangement of keratinocytes in lower half of epidermis (H&E stain 40X).

Management of ulcerations and necrotic wounds in chronic radiodermatitis is general wound care guidelines are the most important. These include the application of wound dressings that absorb the wound exudate and protect the wound from environmental damage and bacteria to prevent secondary infections. For patients with very moist wounds, hydrogel or

hydrocolloid dressings can be used. These dressings do not adhere to wounds, are absorbent and can easily be replaced. For infected wounds, silver-containing dressings can be used. Chronic ulcerations need to undergo selective and careful debridement in order to clean the wound and stimulate the healing process<sup>2,3</sup>. In some severe cases, surgical interventions are necessary in which skin-flaps are used<sup>4</sup>.

In general, dental radiography has a little dose and risk for the individual patient and dental workers provided that the principles of protection are applied; it is less dangerous in comparison to a few days of natural background radiation to which we are all constantly exposed<sup>5</sup>. Dental radiography doses and risks are minimal unless dealt without being cautious, which is the case of the radiographer presented here.

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