ROLE OF PHYSICAL MEDICINE IN PREVENTION AND MANAGEMENT OF PRESSURE SORES

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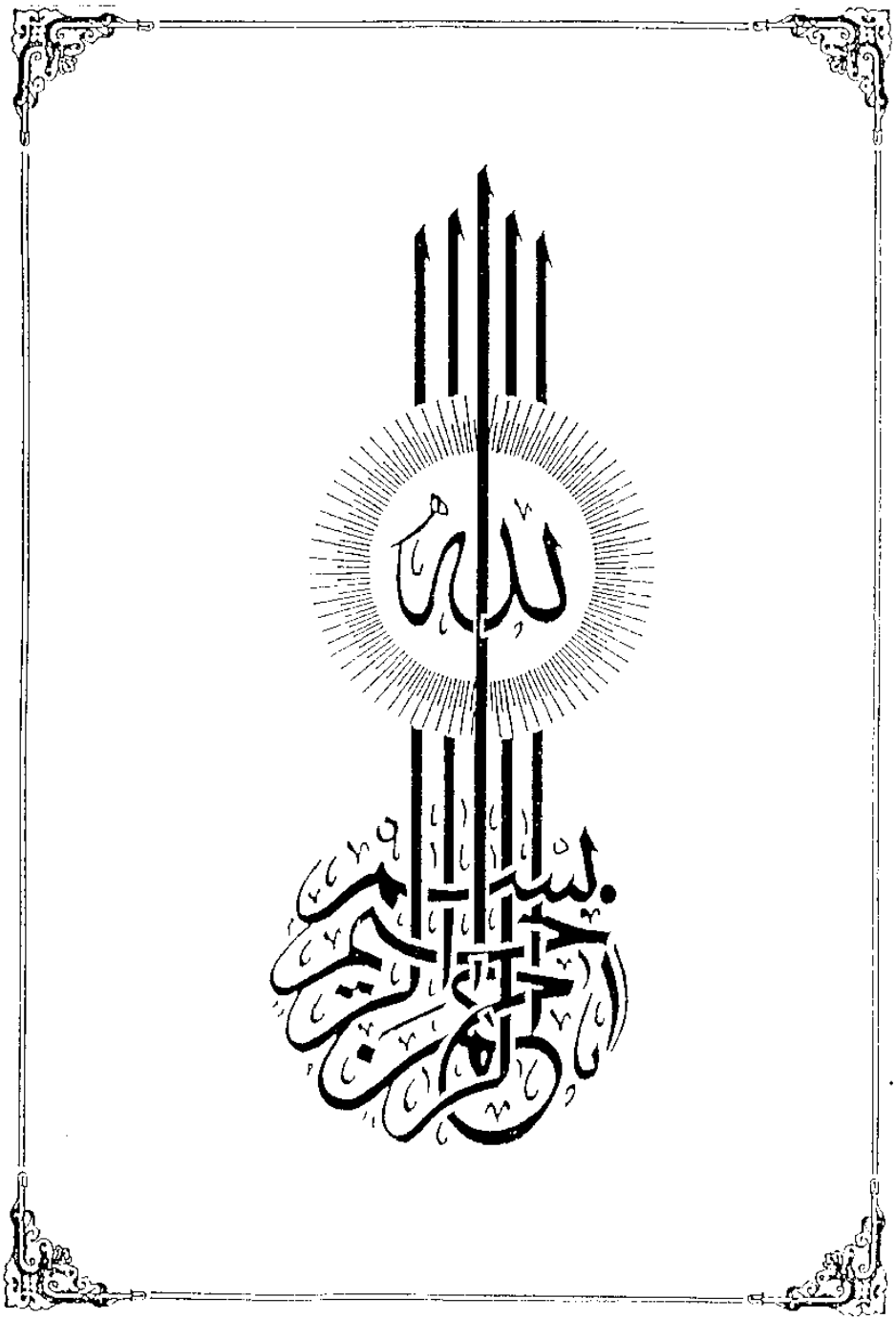

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ROLE OF PHYSICAL MEDICINE IN PREVENTION AND MANAGEMENT OF PRESSURE SORES

Introduction:

Pressure sores are localized areas of cellular necrosis that usually develop over bony promeniences subjected to excessive pressure for varying periods of time [Kosiak, 1976].

Pressure sores are a major complication that may occur to patients who remain seated for extended periods of time as in spinal cord injuries, deblitating diseases and coma. It may lead to sepsis, osteomylitis, amputation and even death.

During the early period, the rehabilitation process is focused on prevention rather than treatment of the pressure sores. If they occur different physical and medical measures can take place. Assistive devices as turning frames, electric beds, water beds, circular beds, sorbo beds, Ultra-violet Rays - as antiseptic technique and good promotion for blood supply - and Ultra-sonic waves are of a great value in the management of bed sores. But all these factors cannot substitute for good nursing care.

Aim of the Work:

Review of the literature about pressure sores in order to find out the most effective method in its prevention and treatment.

HISTOLOGY OF THE SKIN

The normal skin is divided into three principal layers namely the epidermis, the dermis and the subcutaneous tissues.

The epidermis is further subdivided into four layers levelled from within outwards as follows:

- Stratum basal or basal cell layer.
- Malpighian or prickle cell layer or stratum spinosum.
- The granular layer or stratum granulosum.
- The horny layer or stratum corneum.

Zelickson (1965) and Hamm (1969) illustrated an extra layer. The so called lucid layer lies above the granular layer and is found only on the palms and soles, it appears as a clear bright thin hemogenous line in contrast to the fibrous appearance of the horny layer. The basal cell layer lies deepest in the epidermis and next to the dermis. It consists of two types of cells namely the basal cells and melanocytes. Van Scott and Ekel (1963) described the basal cells as cells which are columnar in shape and their long axis being at right angles to the dermis beneath them. They contain a dark staining oval or elongated nucleus which lies in a deeply basophilic cytoplasm. They are joined to each other by intercellular

bridges. The mitotic figures appearing above the basal layer represent the division, that had been initiated in the basal cell layer. While, Clark et al. (1961) studed that, the melanocystes appear as clear cells with a small darkly staining nucleus in clear cytoplasm, that is when they stained with haematoxylin and eosin. As regards the malpighian layer which is also called the prickle cell layer. Lever (1967) stated that its cells appear to be hold together by prickles which are actually an intra-cellular layer bridges which provide greater stability to the polygonal prickle layers.

The granular layer is composed of one to four rows of a diamond shaped cells, filled with deeply basophil-lic granules. Ham (1969) noticed that the thickness of this layer has an inverse relationship to the rapidity of keratinization. Lever (1967) stated that the horny layer is normally containing no nucleus and is continu-ously shed from the surface and it appears as thick fibres extending parallel to the surface, its hardness is due to keratin.

Within the epidermis the following appendages also exist namely the eccerine glands, the apocrine glands, the sebaceous glands, the hair and lastly the nail.

Bethel Solomons (1979) described them as follows: the eccrine glands exist allover the skin but not in the mucus membrane. They are present more in the palms than the legs, the glands start as a coil in the dermis and opens invisibly on the skin surface. Its secretion is a clear watery fluid containing 99% water with chloride, lactic acid, urea, nitrogen and other substances.

The apocrine glands are large sweat glands whose ducts open into hair follicles to which they are attracted. They are coiled tubular glands with ducts leading down to a coil of secretary tubules, they are found in the axilla, anogenital areas, nipple and areola but do not develop fully until puberty. Its product is a whitish sterile fluid containing proteins, carbohydrates and other substances. It is evoked in response to stress, pain or sexual activity.

The sebaceous glands are found allover the body except on palms and soles, the glands have no lumen and their secretion is the result of decomposition of their cells. Most of it being discharged through the sebaceous ducts into a pilo sebaceous follicle. They are multilobulated and appear as a pouch hanging on the outerside of the follicle. Its secretion is known as sebum and contains fatty acids, cholesterol and other substances.

The hair: each hair follicle is composed of a hair with its inner and outer sheathes at its lower end lies the hair bulb into which protrudes the connective tissue papillae which is richly supplied with blood.
The nails are translucent compact. Solid plates of keratin, the matrix lies beneath the nail fold. The paronichium is the soft tissue surrounding the nail border.
On the other hand the dermis can be divided into two parts: the papillary and the reticular part. The papillary part lies against the epidermis above where the papillae strik up into it at irregular intervals and most of the papillae contain blood vessels and some contain nerve elements such as dactile corposcles, the reticular part contains connective tissue boundless, below which lies the subcutaneous tissue.

The dermis contains connective tissue fibres cellular elements. Blood vessels, nerves muscles and lymphatics. These structures intermingled so as to give the dermis its texture. The connective tissue fibres can still be subdivided into three varieties, collagenous, elastic and reticulin fibres.

Porter and Poppas (1959) and Zelickson (1963) stated that the collagenous fibres form 75% of the total fibres.

Collagen is an albuminoid substance of which the bundles are comprised. Fibroblasts lie between the bundles and so by the electron microscope one can observe at the outer surface of the fibroblasts, the polymerisation of collagen fibres by the aggregation of tropocollagen particles.

The elastic fibres run parallel or oblique to the collagen and enclose the bundles. The reticular fibres are composed of collagen fibrills as proved by the electron microscobe by Gross and Groekgoff (1961). It probably ensures stability between dermis and epidermis.

The cellular elements of the dermis consist of migratory cells and fixed cells, the migratory cells are the leucocytes which lie sparsely around blood vessels, lymphatics and the histocytes which resemble fibroblasts having large oval or kidney shaped nuclei. While the fixed cells are the fibroblasts which are spindle shaped with elongated nuclei and the mast cells which are spindle shaped with oval or round nuclei.

HEALING OF WOUNDED SKIN

The healing of wounded skin according to the type of the wound:

1) Full thickness surgical incisions are those which disrupt tissue continuity but no material is lost. The epidermal cells from the edge of the incision and from the transected sebaceous and sweat duct rapidly migrate to cover the length and breadth of the wound within a matter of 24 hours. During the next 24 hours, this epithelial layer produces proteases and collagenases which remove the fibrin and old collagen and thus pave the way for dermal repair [Dunphy and Udupa, 1955]. The first reaction in the dermis consists of vascular dilatation and proliferation with diapedesis of leucocytes. The destroyed dermal element are removed and between the third and six days fibroblasts begin to appear and produce young collagen to repair the dermal injury [Weinstein and Van Scot, 1965]. After the sixth day there is remolding of the established dermis and therefore there is progressive reduction in the cellular reaction of the dermis and in the number of blood vessels.

2) Full thickness excised wounds cause an immediate cellular response and within 24-48 hours the epidermal

cells begin to migrate, these cells as in the case of simple excised wound remove the damaged collagen by vitrue of their enzymes. Between the third and fifth day fibroblasts invade the area and begin to lay down fresh collagen this proceeds with remarkable rapidity.

It is important to appreciate that it is only after the wound has been covered by proliferating epidermal cells that dermal repair commences therefore in the content the dermis is dependant upon the proper functioning of the epidermal cells in providing the initial protective covering.

3) Partial thickness superficial injuries involve loss of the entire epidermis and the superficial part of the dermis rate and upper part of the pars reticularis, within 24 hours epidermal cells commence to migrate from the periphery of the wound and from the duct of the cut sweat and sebaceous gland. The relatively intact dermis remains inactive for nearly a week whilst the epithelial islets spring up from the served ducts and epidermis also migrate inwards from the periphery. Fluid from the superficially injured dermis forms a kind of subepidermal blister beneath the regenerating epidermis and then within this fluid new collagen begins to form to replace the lost superficial dermis.

PRESSURE SORES

Definition and terminology:

The condition is liable to develop in persons suffering from prolonged debilitating illnesses such as cachexia due to malnutrition, general shock following injury or burns, atherosclerotic vascular changes in old age and lesions of the nervous system such as syringomylia multiple sclerosis, leprosy and traumatic lesions of the spinal cord.

Trumble (1930) points out that there is a strength duration relation in the production of sores there must be a minimum time and minimum pressure. Kosiak and associates (1959) undertook a study in an attempt to determine accurately the effect of both constant and alternating pressure on normal and denervated muscles. They found that tissues subjected to application of alternating pressure whereby the tissues were completely free of pressure for five minutes interval showed consistently less change or no change when compared with tissues subjected to an equivalent amount of constant pressure.

The names bed sore and decubitus ulcer are misleading as this condition may not only occur in bedridden patients but in any late stage of spinal cord injury

PRESSURE SORES