What you need to know about Steroid Drug
(Corticosteroid-induced) Osteoporosis

Corticosteroid-induced Osteoporosis is Both Preventable and Treatable
According to the American College of Rheumatology (ACR), more than 30 million Americans may be affected by diseases commonly treated with corticosteroids. Steroids such as Prednisone are used as therapy for many inflammatory and autoimmune diseases such as asthma, rheumatoid arthritis (or related diseases), lupus or inflammatory bowel diseases. They are also used to treat many allergic conditions. While steroids are generally effective in treating such ailments, they are also the most common cause of drug-induced osteoporosis.

Corticosteroids are drugs closely related to cortisol, a hormone which is naturally produced in the adrenal cortex (the outer layer of the adrenal gland). Cortisol plays an important role of controlling salt and water balance in the body, and regulating carbohydrate, fat and protein metabolism. When the body becomes stressed, the pituitary gland at the base of the brain releases ACTH, (adrenocorticotrophic hormone) which stimulates adrenals to produce cortisol. The extra cortisol allows the body to cope with the stress such as infection, trauma, surgery, or emotional problems. When the stress ends, the adrenal hormone production returns to normal.

Corticosteroids (Steroids): How do they work?
Corticosteroids act on the immune system by blocking the production of substances that trigger allergic and inflammatory action, such as prostaglandins. However, they also impede the function of white blood cells which destroy foreign bodies and help keep the immune system functioning properly. The interference with white blood cell function yields a side effect of increased susceptibility to infection.

Steroids and Bone Remodeling
Steroids affect calcium and bone metabolism in many ways. Steroids decrease the amount of calcium absorbed by the intestine and increase calcium excretion through the kidneys. These two factors combine to produce a decline in the circulating ionized calcium concentration. This triggers the parathyroid glands to increase the secretion of parathyroid hormone (PTH), a condition known as secondary hyperparathyroidism. Elevated PTH levels result in increased bone breakdown, as the body attempts to rectify low circulating calcium levels by releasing it from the bones into the blood. Steroids can also decrease the levels of the sex hormones, estrogen in women, and testosterone in men. The resulting decreases are associated with increased bone loss. Steroids can also be linked to muscle weakness, which may lead to inactivity and additional bone loss. Another major effect of steroids is they can impact the bones directly by suppressing bone formation (osteoblastic) activity.

Patterns of Bone Loss
There are two types of bone tissue: cortical and trabecular. Cortical bone forms the outer shell of bone and comprises 80% of the skeleton. Trabecular bone comprises the remaining 20% and is found on the inner portions of bones. Each bone in the skeleton contains both types of bone, but their proportions vary. Steroids primarily cause bone loss in the areas of the skeleton that are rich in trabecular bone, such as the spine and upper femur.

Dose and Duration
Bone loss occurs most rapidly in the first 6 to 12 months of therapy and is dependant on both dose and duration. Other risks that increase bone loss due to steroid use are age, gender, smoking and underlying disease. For example, an elderly man on steroids may experience greater bone loss and risk for fracture than
a middle aged man. ACR estimates that without prevention measures, an estimated 25% of individuals on long-term steroids will experience a fracture.
The DOSE of steroids is a stronger predictor of fracture risk. While it is not clear whether there is a low-dose threshold below which bone loss does not occur, recent studies have found that inhaled steroids have less of a risk of bone loss when administered in standard doses AND apart from systemic steroids.

Osteoporosis Management
Steroid-induced osteoporosis is both preventable and treatable. According to ACR, people on steroids should have a bone mineral density test (DXA) performed to provide a baseline measurement from which to monitor subsequent changes in bone mass. Also, it is recommended to take at least 1500mg of calcium and 800-1000IU of vitamin D daily. This can help maintain normal parathyroid hormone levels and can even preserve bone mass in patients on low-dose steroid therapy that get adequate exercise and activity.

Lifestyle Modifications
One of the most important things you can do to reduce the risk of steroid related bone loss is to eliminate smoking and excessive alcohol consumption (more than 2 drinks per day or binge drinking once a month or more). Increasing physical activity and exercise can help preserve bone and muscle mass, while increasing muscle strength and reducing the risk of falls. This helps with slip and fall instances especially in elderly individuals and those that have experienced steroid-induced muscle weakness.

Bottom Line
Osteoporosis prevention measures should begin early, ideally at the onset of steroid therapy. Experts recommend using the lowest effective dose of steroids for the shortest period of time possible and, when feasible, inhaled or topical steroids should be utilized.

Sources: http://arthritis.about.com/od/steroids/a/osteoporosis.htm

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