



# **TAKING CARE OF YOUR KNEES AT WORK**

**AN ERGODYNE WHITE PAPER**

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## INTRODUCTION

Our knees are complex. Often thought of as a simple hinge in our legs, knees support the majority of our body weight; allow us to stand, walk, run, climb stairs, kick, crouch, sit, and stand up again.

In the workplace, our knees may be used to operate controls, hold or kick objects into place, or serve as a support when kneeling. For workers who spend a great deal of time working on floor level surfaces, or crawling in confined areas, the phrase, "Our knees are our feet!" is appropriate.

## INJURY STATISTICS

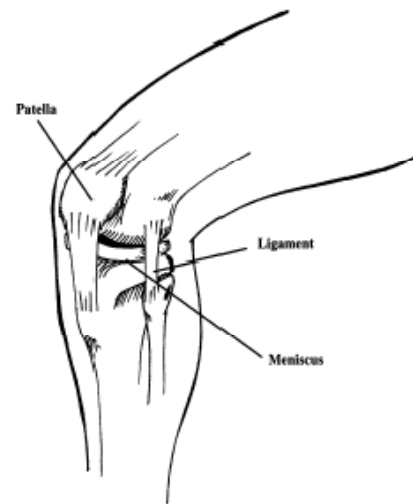
As a result, workplace injuries to knees are not uncommon. In 2006 the US Bureau of Labor Statistics (BLS) recorded over 95,000 serious knee injuries, comprising 8.1 percent of all serious injuries, or a rate of 10.3 knee injuries per 10,000 full time workers (nonfatal occupational injuries and illnesses involving days away from work).

The BLS also noted that the median number of days away from work for a knee injury was 14, compared to 7 days for all types of injuries combined. NIOSH – the National Institute for Occupational Safety and Health noted in one study of shipyard workers that the estimated direct cost for injuries to the knee at \$7,472. And a Liberty Mutual Research Institute for Safety study indicated that knee injuries accounted for 9.7 percent of all workplace injury claim costs in 2000.

## KNEE PHYSIOLOGY

Generally considered to be the largest joints in our body, each knee is comprised of the three main leg bones (femur, tibia, and fibular) plus the kneecap (patella). Cartilage lubricates the movement of the bones where they meet, and along with fluid filled sacs called bursa, cushion impacts to the knee. Wear or damage to the cartilage or bursa are the origin of many common knee injuries.

Large ligaments hold each knee together, and tendons attached to the bones allow muscles to extend and flex the lower leg. If the tendons or ligaments become weak or damaged, the bones may become misaligned, leading to pain and injury when weight is applied. Damage to the tendons and ligaments are common in many athletic knee injuries as well as workplace injuries.



## INJURY TYPES

Most knee injuries can be broadly classified as traumatic (acute) or overuse (cumulative). Traumatic injuries include those resulting from a single incident, such as a fall, impact, or severe twisting, and damage the bones, tendons, ligaments, etc. Overuse injuries develop over time as a result of repeated or sustained actions, or wear and tear. These injuries often affect the bursa and cartilage, along with the tendons and ligaments.

Certain progressive ailments such as osteoarthritis, infections of the various knee components, excess weight (obesity), and the aging process may also contribute to knee ailments.

Just as certain sports are associated with knee injuries, certain trades such as floor layers, carpet layers, tile setters, and roofers have disproportionate rates of knee injury exposures and workers' compensation claims compared to construction workers in general. These workers may spend 75 percent of their time on their knees. The US Mine Safety and Health Administration (MSHA) estimates that 50 percent of all cumulative workplace knee injuries are recorded by low seam miners who work on their knees in cramped conditions.

## **RISK FACTORS AND CONTROLS**

Several approaches may be used to reduce worker exposure to recognized risk factor for common knee injuries, depending upon the task and the working environment.

### **Ergonomics**

- Work positioning – using the ergonomic approach of 'fitting the task to the worker', raise work up off of the floor, where possible, to eliminate kneeling or squatting.
- Sit rather than kneel or squat - where possible, to reduce direct pressure on the knees and stress on the tendons and ligaments. Consider the use of a rolling stool instead of crawling where movement is required.
- Supports - use chairs or specialized kneeling supports to distribute the worker's weight across a broader area (shins, thighs, chest, etc.), reducing direct pressure on the knees.
- Evaluate lifting tasks – many risk factors for manual lifting are also risk factors for knee injuries. Improvements made to lifting tasks may pay dividends in the prevention of knee injuries as well.

### **Personal Protective Equipment (PPE)**

- Wear kneepads, or use portable cushions, to pad, insulate, and distribute pressure across a broader portion of the knee. This is especially true on hard or irregular surfaces, cold surfaces, or where hard or sharp items might dig into the knees.
- Regularly clean work clothes and PPE - skin irritations on the knee leading to inflammation and infection of the cartilage and bursa were noted in one major study as a significant factor. The study suggested that workers who use kneepads on a regular basis have multiple pairs to allow for cleaning and drying time between uses.
- Walking and sustained standing on hard surfaces transmits shocks through the knees. Selection of quality footwear and insoles, or anti-fatigue matting, can cushion these shocks. Supportive footwear is also important to reduce the risk of twisting a knee due to a slip, when climbing, or when walking on uneven surfaces.

### **Work Environment And Activities**

- Avoid shocks transmitted to the knee caused by jumping off of trucks, using the knee as a hammer, etc. Provide and use ladders for access and task specific tools for applying impact.
- Avoid sudden twisting, stopping, or changing of direction when walking. These motions are associated with high risks of knee damage in the work place, just as they are in high-risk sports such as football, basketball, and skiing.

### **Health And Fitness**

- Move and change postures frequently – static postures, including kneeling or sitting for long periods, or the sustained operation of foot pedals, decrease blood and nutrient flow to the tendons, ligaments, cartilage, and bursa.

- **Exercise to maintain the condition of leg muscles, tendons, and ligaments that stabilize the knee, reducing the risks of twisting or misalignment. Conditioning exercises also improve joint flexibility, strength, and range of motion.**
- **Reduce excess weight - improvements in overall health will be noted in addition to reducing wear and direct impact on the supporting knee joints with every step.**

## **SUMMARY**

Our knees support us at work as well as in general life activities. In some occupations, worn or tired knees become the limiting factors in determining whether an employee can remain on that job. The extent of the problem is significant in terms of disability and workers' compensation costs.

While some risk exposures, such as the act of walking and the aging process are unavoidable, certain actions, ergonomic controls, and the smart use of PPE can reduce the risks of injury.

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