



**Service Priorities and Programmes**  
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**An Unprecedented Attempt to apply Physics to Delineate Possible External Forces Causing Spontaneous Fracture of Bed-ridden & Frail patients in Long Term Care Facilities**

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**Introduction**

Spontaneous fracture is one of the common health care risks of bed-ridden & frail patients in Hong Kong and world-wide health care facilities. Many literatures mention the possible detrimental force called torque. However, the current literatures have no further delineation of the torque in association with bedside caring skills.

**Objectives**

This CQI programme aims at trying an experience-based attempt to apply Physics to delineate the two possible external forces (torque and Newton Second Law) causing spontaneous fracture of bed-ridden & frail patients.

**Methodology**

The 2 concepts of Physics will be explored are torque and Newton Second Law (FORCE equals to MASS times ACCELERATION):

(I) Torque

The first concept 'torque' is a rotational force on an object and Cheshire Home, Shatin (SCH) ward staff were trained to avoid using this detrimental force to patients since year 2012.

(II) FORCE equals to MASS times ACCELERATION

This second concept is inspired by the force concepts of martial arts. Ward staff are trained to avoid using this detrimental force to patients since November 2017. This detrimental force has the emphasis on the caution to ward staff avoid using force-acceleration during care of patients' degenerative limbs.

The care of patients by ward staff must involve the use of PUSHING or PULLING forces. Ward staff are trained to avoid using the torque (since year 2012) and force-acceleration (since November 2017) to the degenerative, spastic or contracture limbs including toes and fingers and these detrimental forces may cause spontaneous fracture.

**Result**

100% of ward staff are trained to avoid using torque during bedside care of patients' degenerative limbs as at December 2017 and 65% of ward staff are trained to avoid using force-acceleration. The outcomes of this CQI programme are demonstrated by the rapid decrease of spontaneous fracture rate (no. of spontaneous fracture per 100 patients per year) from 2.305 (Yr 2013) to 0.433 (Yr 2016) & 0.445 (Yr 2017) with 81.2% drop in spontaneous fracture rate. SCH attained the achievements to reduce spontaneous fracture rate to a low level comparable to international high quality long term care facilities.