



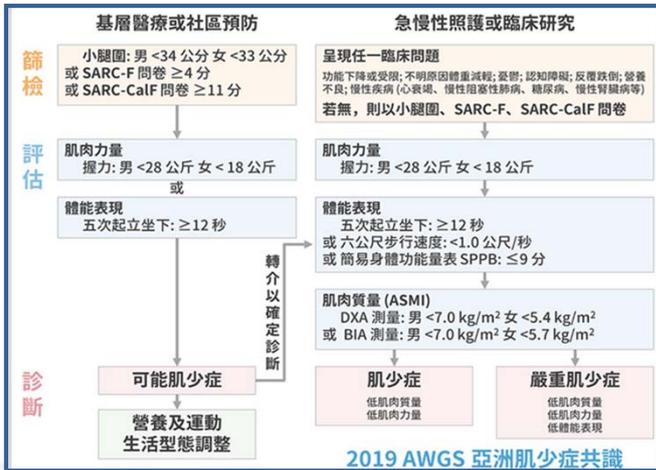
# <肌少症的足部壓力中心訊號分析>

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## 研究背景

肌少症(Sarcopenia)是老年失能的兇手，特徵是持續且全身普遍的骨骼肌重量及功能減少，可能造成失能、生活品質下降，甚至是生活無法自理，以及死亡風險增加。

因至今肌少症在醫學尚未有確切的定義，所以希望能藉由比較COP與各種肌少症的標準，從中找到關聯，以利簡化後續的推算。



## 研究分法

足部壓力中心訊號 (COP)，藉由測力板偵測當身體平衡改變時，對測力板的作用力改變情形，收集測力板前後方向 (人體前後)，左右方向 (人體左右) 和頭尾方向(上下垂直) 三軸的力矩數據。

由醫院測量COP數據，算出其特徵參數，再依據各不同肌少症及非肌少症的標準，算出統計差異，可看出以小腿圍為標準的顯著差異最多。

### ▲肌少症的五個標準

| ASMI_Female | y.IMF1.Sap | C5E2    | C6E2    | Asia_Female | ME10    | SD1E2/ME11 | x.raw.Sap | C04     | C0E2    | C6E2    |
|-------------|------------|---------|---------|-------------|---------|------------|-----------|---------|---------|---------|
| saco_mean   | 1.12806    | 0.1442  | 0.07754 | saco_mean   | 0.00505 | 30.5763    | 1.74115   | 0.14597 | 0.12465 | 0.06948 |
| saco_std    | 0.15824    | 0.06167 | 0.03781 | saco_std    | 0.00303 | 162.28316  | 0.4893    | 0.34642 | 0.05648 | 0.03336 |
| non_mean    | 1.0059     | 0.11708 | 0.06257 | non_mean    | 0.00386 | -80.78846  | 1.94226   | 0.00188 | 0.10637 | 0.05809 |
| non_std     | 0.22879    | 0.04711 | 0.03188 | non_std     | 0.00256 | 305.64185  | 0.44849   | 0.35712 | 0.04775 | 0.03251 |
| t-test      | 0.01552    | 0.01748 | 0.04697 | t-test      | 0.01327 | 0.00745    | 0.01189   | 0.01635 | 0.03934 | 0.04882 |

| 肌肉握力 ASIA_Female | ME03     | C1E2    | 6M_Female | SD4E2/ME14 | x.raw.ApE | x.IMF6.Sap | E02     | E04     |
|------------------|----------|---------|-----------|------------|-----------|------------|---------|---------|
| saco_mean        | 0.00176  | 4.69125 | saco_mean | -40.2352   | 0.5021    | 0.09611    | 4.62843 | 6.67741 |
| saco_std         | 0.0062   | 1.59281 | saco_std  | 159.00539  | 0.19594   | 0.04692    | 0.87487 | 1.26217 |
| non_mean         | -0.00031 | 4.00224 | non_mean  | 14.26676   | 0.57083   | 0.1136     | 4.90159 | 7.0715  |
| non_std          | 0.0048   | 1.67302 | non_std   | 150.36679  | 0.20522   | 0.04645    | 0.57056 | 0.82314 |
| t-test           | 0.03453  | 0.02648 | t-test    | 0.03636    | 0.04184   | 0.02589    | 0.02978 | 0.02978 |

### ▲由左至右，由上到下依序為女性的ASMI、骨質疏鬆、肌肉握力、6公尺行走速度之顯著差異

| 小腿圍_Female ME05 | SD1E1    | SD2E1   | SD1E2   | SD2E2   | SD5E2   | m1E1    | m2E1    | m1E2    | m2E2    | m8E2    | V00     | V01     | V02     | V05     | V10     | V11     | V12     | V13     |         |
|-----------------|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| saco_mean       | -0.00681 | 0.05556 | 0.06433 | 0.05161 | 0.07495 | 0.46876 | 0.05553 | 0.06429 | 0.06158 | 0.07491 | 0.46848 | 0.10716 | 0.08426 | 0.04517 | 0.01572 | 0.12439 | 0.09204 | 0.0497  | 0.03963 |
| saco_std        | 0.0224   | 0.03161 | 0.03522 | 0.04159 | 0.05361 | 0.47899 | 0.03159 | 0.0352  | 0.04358 | 0.05356 | 0.47859 | 0.05997 | 0.04779 | 0.02516 | 0.01242 | 0.08746 | 0.06087 | 0.03763 | 0.03139 |
| non_mean        | 0.00589  | 0.04358 | 0.05036 | 0.04277 | 0.05225 | 0.30893 | 0.04355 | 0.05035 | 0.04274 | 0.05221 | 0.30783 | 0.08523 | 0.06564 | 0.03498 | 0.01128 | 0.08938 | 0.0656  | 0.03457 | 0.02837 |
| non_std         | 0.02097  | 0.02059 | 0.02548 | 0.01774 | 0.02534 | 0.22534 | 0.02057 | 0.02546 | 0.01773 | 0.02532 | 0.22523 | 0.03743 | 0.03043 | 0.01642 | 0.00661 | 0.03967 | 0.02902 | 0.01593 | 0.01512 |
| t-test          | 0.01369  | 0.04038 | 0.04256 | 0.00561 | 0.00916 | 0.03775 | 0.04027 | 0.04242 | 0.00559 | 0.00933 | 0.03773 | 0.04441 | 0.03323 | 0.02886 | 0.03461 | 0.01262 | 0.01053 | 0.00919 | 0.02781 |

| V14       | V15     | y.IMF3.ApE | y.IMF1.Sap | y.IMF3.Sap | C01     | C02      | C03      | C05      | V20      | V21     | V22     | V23     | V24     | V25     | P1E1    | P2E1    | P1E2    | P2E2    |         |
|-----------|---------|------------|------------|------------|---------|----------|----------|----------|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| saco_mean | 0.03661 | 0.02756    | 0.53787    | 0.97372    | 0.45981 | 0.09685  | 0.08754  | 0.10616  | 0.20044  | 0.16663 | 0.12812 | 0.06927 | 0.05177 | 0.04378 | 0.03247 | 3.8896  | 5.14244 | 5.20664 | 7.13672 |
| saco_std  | 0.03347 | 0.0281     | 0.06797    | 0.23275    | 0.10558 | 0.2445   | 0.19874  | 0.24071  | 0.32493  | 0.09852 | 0.0715  | 0.04184 | 0.0334  | 0.03539 | 0.0299  | 4.87891 | 6.17367 | 6.52153 | 9.72852 |
| non_mean  | 0.02582 | 0.01673    | 0.56604    | 1.1034     | 0.5098  | -0.02781 | -0.02061 | -0.03261 | -0.01722 | 0.12422 | 0.09316 | 0.04908 | 0.03722 | 0.03199 | 0.02002 | 2.01533 | 2.64767 | 1.87033 | 2.89188 |
| non_std   | 0.01492 | 0.00924    | 0.05484    | 0.15279    | 0.05    | 0.2671   | 0.22732  | 0.24516  | 0.29328  | 0.04961 | 0.0394  | 0.02071 | 0.01867 | 0.01661 | 0.01081 | 2.19847 | 3.06352 | 1.73979 | 3.07892 |
| t-test    | 0.04207 | 0.00915    | 0.04609    | 0.00307    | 0.02102 | 0.04526  | 0.03906  | 0.01781  | 0.00307  | 0.00726 | 0.00479 | 0.00376 | 0.01205 | 0.03898 | 0.00593 | 0.01632 | 0.01456 | 0.00486 | 0.00314 |

◀ 小腿圍顯著差異