
Proposal for a National Plan to tackle Obesity, Movement and Function in the Children and Youth Population of Ireland

1.1 SITTING IS BAD FOR HUMANS

Over the past few decades, obesity has increased, not only in Ireland, but all over the developed world. While fast food and over-eating early in life contributes to this situation there are other unseen reasons why the human race needs to focus on improving simple things to ensure we overcome the danger of obesity.

The principle means of over-coming obesity is through improved nutritional habits and promoted exercise. While nutritional advice is where most plans to curtail the spread of obesity, the importance of exercise in the process cannot be overlooked.

The Australian Commission for Physical Activity and Sedentary Behaviour Guidelines reported that 9 out of 10 young teenagers don't move enough (Department of Health, Australian Government, 2014). They have aimed their programme to change habits of 13 to 17 years old irrespective of culture, gender, background or ability by providing information on physical activity, sedentary behaviour, the dangers of sitting and "screen time activities" be it television, tablets or smart phone.

It is our proposal that Ireland urgently needs to address similar issues with our growing and developing teenage population. The "cry of obesity" is being made but there needs to be a specific national plan to provide directives to reduce and possibly eliminate the appalling health problem associated with rising obesity levels. There is an immediate need for an integrated physical education, nutrition and exercise plan that is not sports based but movement and exercise based to reach every student in all our schools irrespective of sporting ability, exercise interest or those who prefer the sedentary lifestyle. Such a plan must aim to ensure children to be fit, healthy and feel good.

The overall aim of a national programme should include social, emotional and intellectual, health as well as physical benefits to all our students.

1.2 RESEARCH

It is known from recent research that obesity is becoming a serious issue in Ireland and the UK and this is reflected throughout the Western world. For example, researchers agree that childhood obesity has more than tripled in the past 30 years. In the United States of America, for example, it is estimated that 17 percent of children and adolescents (ages 2-19 years) are obese.

In the UK it has been found that obesity is a serious issue for teenagers. According to Vivienne Nathanson, head of science and ethics at the British Medical Association, said: “Young people in Britain are increasingly likely to be overweight, and this can lead them to indulge in binge drinking, have a sexually transmitted infection and suffer mental health problems later as adults. Obesity is not only debilitating but can cause low self esteem. According to experts low self esteem became a pop culture phenomenon in the mid-eighties, and since then has carried a low impact response when in fact low self esteem is a very serious issue facing the majority of today’s teenagers.

In Ireland according to Prof Michael Gibney (UCD) since 1990, the prevalence of weight problems and obesity among teenage boys has more than tripled, from 6pc to 19pc, while it has risen from a higher base of 15pc to 17pc among girls. The rate of obesity has increased from 1pc to 8pc among men, and from 3pc to 6pc among women (Gibney, 1990)

The Irish Times (2016) has quoted a study in the UK by Ezzati et al which states that by 2025 37% of Irish women will be obese. It also states that Irish men are already have the highest body mass index in Europe. According to the WHO (World Health Organisation) Ireland are set to be the most obese country in Europe (WHO. 2015). Dr. Donal O’Shea stated that obesity is a big social and public health problem in Ireland. He reported “25% of 3 year olds, 25% of 9 year olds, 26% of 13 year olds are overweight or obese” (Growing Up In Ireland).He further reported that 2 out of 3 Irish adults were overweight or obese (SLAN, 2007, NANS, 2011).

He claimed that the cost of obesity in Ireland in 2009 was €1.13 billion, €398 of which was in direct healthcare costs.

“The dangers associated with obesity are well documented. Children who are obese are more likely to have high blood pressure, high cholesterol, and Type 2 diabetes. Not to mention the psychological toll obesity has on children, which can lead to drug and alcohol abuse, depression, eating disorders and other health issues” according to Nigel Hawkes, Health Editor Sunday Time (2003) summarising a report by the British Medical Association.

1.3 THE DANGERS OF OUR SEDENTARY LIFESTYLE

Sitting needs to become a major cause of concern for all those who want to find a better functional society. Too much sitting sets the tone for poor function, poor motor skills and lower participation in recreational sports and even simple forms of exercise - all of which enhance the qualities of life of a country's citizens.

According to a report in the Washington Times (2012) sitting is one of the worst positions for the body to maintain. After just 20 minutes hunched over in a chair, blood pools in the legs and immense pressure builds on the spine.

For our young teenagers sitting is the main activity in school and in the home. At primary school level children sit for most of the school day – up to 5.5 hours. In post-primary this time extends to 7 hours. To add in the time spent sitting in a car or bus, sitting completing home work or watching television, computers, tablets or smart phones and the time adds up very quickly to 10 to 12 hours per day. While this is very high the worrying part is the reduce time the teenager, in general, has for physical activity of any level.

The problem for children or teenagers who are sitting so much is that a muscle imbalance develops between the muscles in the front and the back of the body. This occurs because the muscles at the front of the body become short, strong and tight and overcome the muscles at the back of the body through constant sitting. While out gluteus muscles are large and powerful, they are also extremely lazy and tend to let the hamstring and lower back muscles do the work that is originally intended for them. Hence the problems we see in sport with hamstring injuries and other serious problems associated with imbalances in hamstring flexibility or hip extension issues. In work, the lower back takes up the slack and in middle aged adults the problem manifests itself as lower back pain. Both of these problems in many cases can be traced back to lazy gluteus maximus muscle and to the practice of sitting for long periods of time growing up.

2.1 INTERVENTION NEEDED TO ADDRESS OBESITY

According to work by Acouturier , Duché and Timmons (2011) tissue growth and maturation are determinants of impaired energy metabolism later in life but also as a promising way to reverse metabolic inflexibility given the plasticity of many tissues in youth. In their research they attempted to identify perspectives for future investigations of metabolic flexibility in obese children that will improve our understanding of the genesis of metabolic diseases associated with obesity.

In many ways the connection between obesity and a lack of joint mobility and muscle fibre flexibility is very close. Obese students lack the confidence to play sport, they become very inflexible and this further leads to problem with their lifestyle and general health issues.

According to Gentles (2010) while flexibility training is perhaps the most frequently overlooked aspect of fitness, the benefits of flexibility training should not be ignored. The benefits of flexibility training include, but are not limited to, enhanced joint range of motion, balance, relaxation, and reduced work and life activity exercised induced soreness and a greater feeling of general wellness.

Regular stretching can improve a person's flexibility by 10-15 per cent in just four to six weeks (Research Quarterly for Exercise and Sport).

One of the vital aims with increased flexibility is the motivation for teenagers and indeed adults to exercise and to increase their exercise potential at recreational and participation sport levels.

The 5 major components of fitness are: speed, strength, stamina, skill and flexibility. For people who are over-weight and obese working on flexibility development will present the easiest form of exercise to do. Regular flexibility work can become a habit and the aim to influence participation in aerobic activities such as walking, jogging, cycling or swimming becomes easier.

Many experts believe that we should begin by using flexibility as the carrot to introduce the obese teenagers to a normal of exercise and indeed participation sport.

As stated from the outset, the programme to overcome Ireland's obesity problem is to use the present physical education programmes in post-primary schools as well as in primary schools as the front line in the assault of this social, emotional, health and physical inhibiting curse.

2.2 PROGRAMME NEEDED

At school we need an aggressive programme to counteract the problems that develop as a result of our young people sitting too long each day. Obviously having children stand and exercise for a few minutes in every class is not always practical as chairs and tables take up space. But encouraging real physical movement at break times must top the agenda in our schools programme as well as ensuring that physical education classes are never missed.

However functional flexibility must also take priority. The ability of the human body to function correctly is a basic human right which is being neglected. Our children and teenagers are lagging behind in simple functions such as rotation, bending, hip hinging, squatting, lunging, pushing and pulling (Giles, 2006). Many issues relate to tight hamstring, weak glute muscles and poor core stability which prevent young people from being as physically literate as they should be.

Even if we look at the habits of the teenagers who exercise, the problem can be made worse by their approach to exercise. The present day teenager who may play serious sport or frequents the gym concentrates on developing the muscles that can be seen – the anterior muscle chain. Many, if not all, neglect the important muscles of the posterior musculature – the hamstrings, glutes, lower and upper back. These neglected muscles lead to huge imbalance in human movement patterns and will affect physical behaviour and habits later as adults not only in sport but in work and social physical activities.

3 PROGRAMME CONTENT.

The programme motto is suggested as

Move more, Sit less, Eat well and Be active

The suggested programme will consist of:

- Specific plan for student screening through measurement twice a year in all schools
- Basic set of stretching and strengthening exercises as a corrective programme for general use to be completed for 10 minutes each week in the schools during PE cool-down.
- Recommended physical education homework of 10 minutes of exercises for each student based on results of measurement as an individual corrective programme to be encouraged 4 days per week at home.
- Plan to deliver the programme to the teaching staff in the schools through workshops delivered by Speedflexer, Ireland.

3.1 MEASUREMENT IS IMPORTANT

Knowing the situation is an important step in solving a crisis and the levels of obesity in Ireland is a crisis that must be addressed urgently. If someone visits a doctor or if a car is taken to the garage, the first thing that takes place is testing procedures to determine the extent of the problems.

To develop physical fitness programme we need to start with recommended yet simple series measurements of each student each year during their term at the post-primary school.

A national database needs to be established. The simple tests suggested for each student includes:

- Weight
- Height
- Straight leg raise (Flexibility and mobility)
- Standing long jump (Speed, strength and stabilisation)
- Five continuous hops forward for distance on right and left leg (Strength, balance and bilateral ability)

The importance of these measurements is their simplicity and ease of the measuring process but they reveal much about the physical effectiveness of the student. They also provide a simple yet effective progress report from 1st year to leaving certificate for all students.

Adding the testing programme to the physical education programme would not be a major problem. Testing could be carried out in September/October and January/February each month. The rationale is to test twice per year in the first or second month of the first and second terms.

3.2 RATIONALE FOR THE ELEMENTS OF TESTING

3.2.1 Height and Weight

Measuring height and weight will develop a record for the child and parents to see if development is normal or not during the 5 years of the post-primary years.

Equipment needed: Measuring tape taped to a wall and a weighing scales.



3.2.2 Straight Leg Raise

According to Brad Walker (the Stretching Institute) “Short hamstrings lead to short stride length, which in turn limits speed. The other problem is the potential for injuries like strains, because of the imbalance that tight hamstrings can cause. Regarding an person’s range of movement then 90 degrees is a good starting point.”

The recommended degree of flexibility is 90 degrees. However for the normal population according to Howley and Franks (2003) an angle below 80 degrees is recorded as ‘unacceptable’ while a minimum angle of 80 degrees is ‘acceptable’. However the same authors suggest that an angle of 90 degrees is what is desirable (Howley and Franks 2003).

According to the “American College of Sports Medicine 7th Edition of Guidelines for Executive Testing and Prescription” an extension of 90-135 degrees should be the normative range of movement for the hamstring muscles.

Presently in schools the measuring system used is the Sit and Reach Test. This test is both outdated and inappropriate for the needs of the programme.

CONVENTIONAL SIT AND REACH TEST	SPEEDFLEXER TEST
	
Figure 1a: Demonstration of the sit and reach test which can be easier for this with longer arms and/or long torso and more difficult for those with shorter arms and/or shorter torso.	Figure1b: Demonstration of an individual hamstring flexibility or hip extension test with fixed inactive leg. The fixing of the inactive leg is what makes the score reliable, repeatable and valid.

In a study carried out in a school in Limerick to compare the results of the sit and reach test and the straight leg raised test measured with the speedflexer equipment shows interesting data.

In the study 32 students were assessed on the Sit and Reach and the Speedflexer individual leg measuring device. The individual leg score is very important because it highlights the difference in imbalance between hip extension (or hamstring flexibility) in both legs. Imbalance between right and left hamstring flexibility is the cause of many problems relating to health, physical fitness and sport where imbalances is the biggest cause of many sports injuries as well as reducing the ability to run faster, jump higher and turn more efficiently.

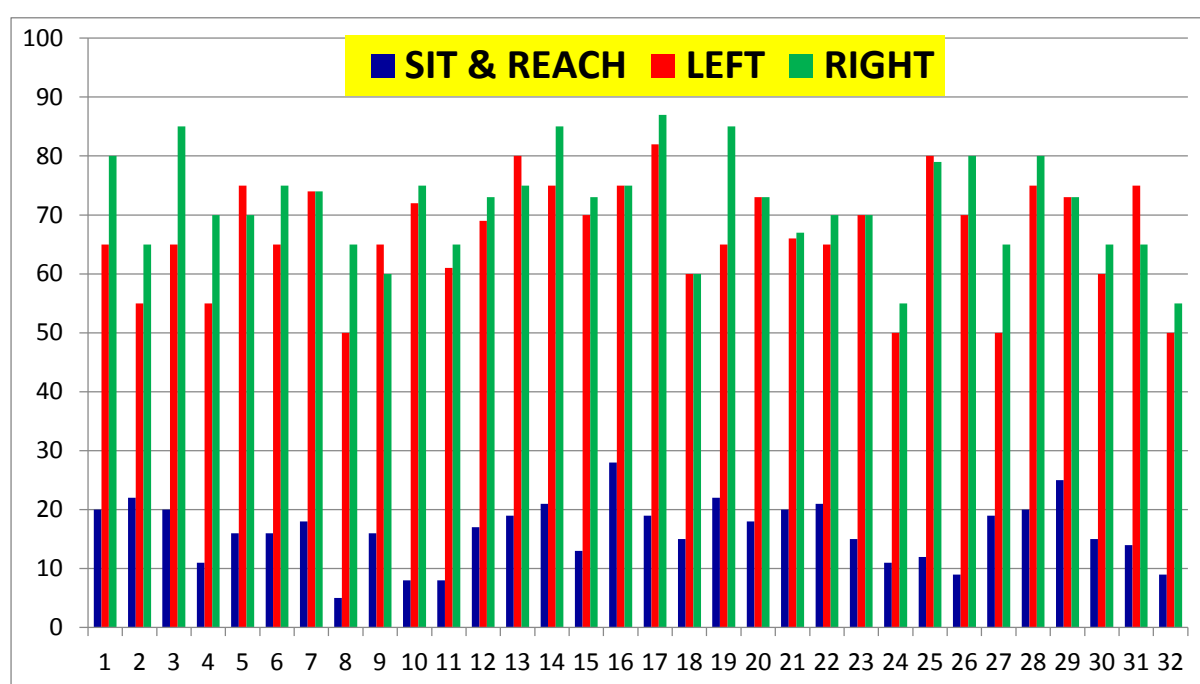


Figure 2; A graph showing a series of 32 teenagers who play football. It is noticeable that there is little or no comparison between the two tests.

Student number 3 achieved 20 in the sit and reach, which is excellent, yet when he was measures on the SpeedFlexer apparatus he had only 65 on his left and 85 on his right which is a massive imbalance of 20.

Student number 16 was the best at sit reach with a score 28 and yet he has only 75. The person is very balanced but his overall flexibility is very limited.

Looking at student number 25; his individual flexibility scores are reasonable – almost 80 degrees on SpeedFlexer apparatus but his sit and reach score are only at just 12. He was given as poor in this test.

In figure 2, we look at a series of 10 teenagers who score 20 which indicates “very good hamstring flexibility” on the sit and reach. However when each individual hamstring flexibility was measure on the speedflexer apparatus we get a much different but much clearer information

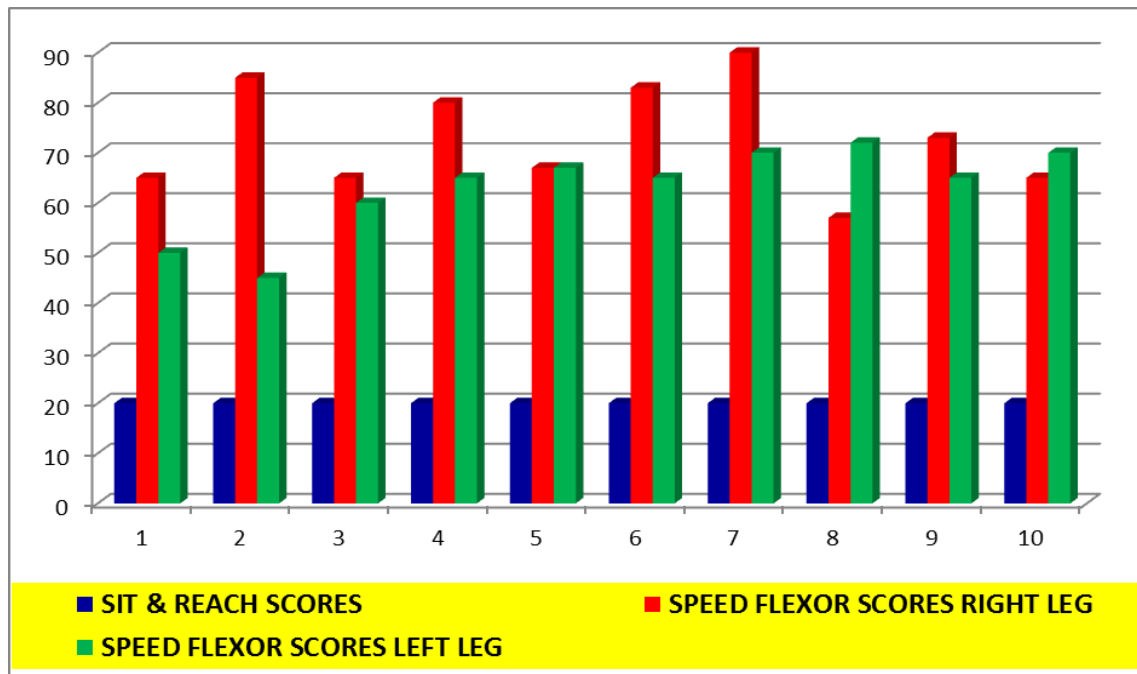


Figure 3: Graph showing a series of 10 players who scored 20 on the sit and reach test but on the speed flexor testing apparatus the individual scores are much clearer identified and problem areas better illustrated.

In figure 4, we present 5 teenagers who scored very low (7 or under which is classified as “poor”) on the Sit and Reach test but using the speedflexer system there was a huge difference in their actual individual hamstring range of motion ability.

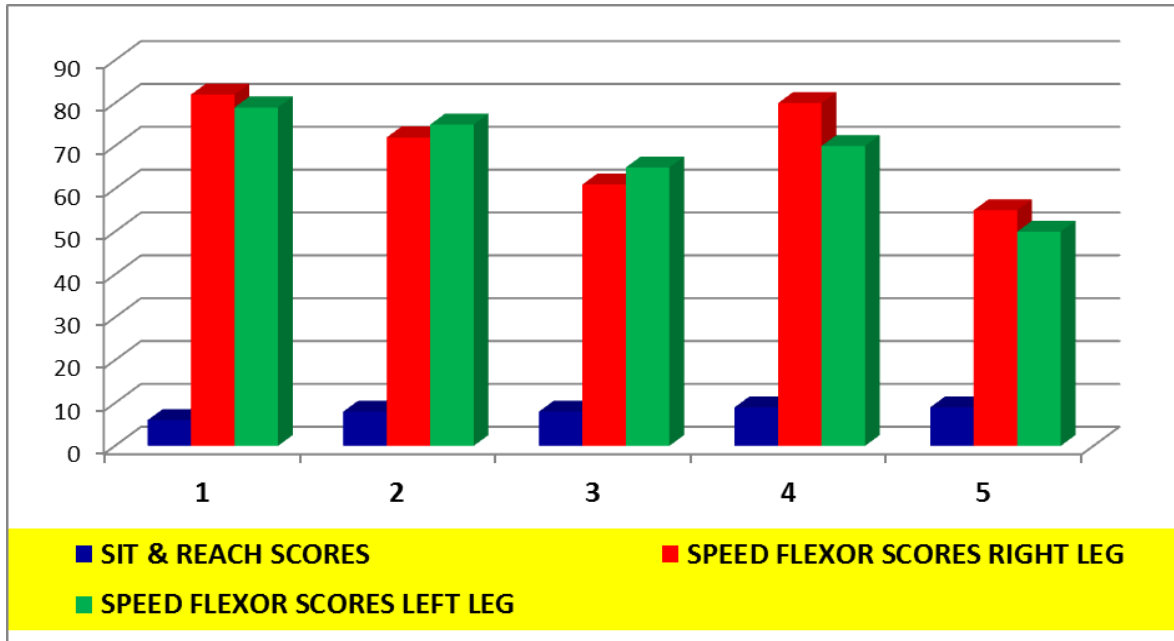


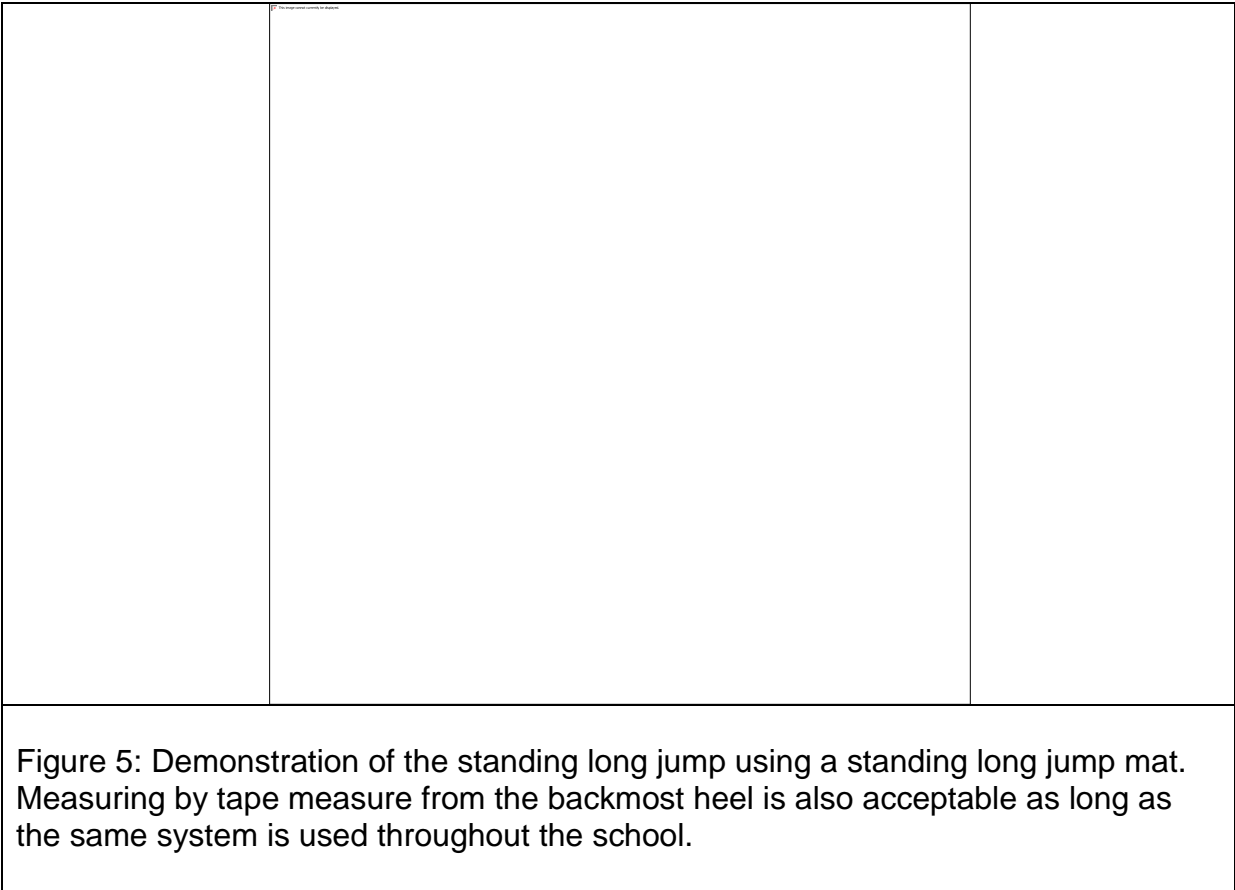
Figure 4: Graph showing 5 players who scored very similar low on the sit and reach test and are clearly identified as being very different with the use of the speed flexor test

3.2.3 Standing Long Jump

The standing long jump for distance is an important skill to assess a child's ability to co-ordinate the movement of arms and legs and to assess their sense of rhythm and timing. The SLJ test is a multi-joint movement that is commonly used to assess explosive leg power (Veligeas, 2012), and can also be general index of muscular fitness in youth (Castro-Piñero et al, 2010). The SLJ test is practical, time efficient, and low in cost and equipment requirements.

An unpublished study by Hennessy and Kilty (2001) concluded that a combination of the standing long jump and the straight leg raise was indicative of physical efficiency and sporting talent.

STANDING LONG JUMP TEST



3.2.4 Five continuous hops for distance (Right and Left)

The aim of this test is to measure individual leg strength, power, stability, balance and co-ordination which is performed by completing five consecutive horizontal hops ending with a two-footed balance landing. The test is measure from the starting line to the heel of the heel of the backmost foot..

The test also measure horizontal and vertical power of each leg with a component of balance and coordination.

By having a central line balance and coordination scores can also be decided.

The Five Hop Test

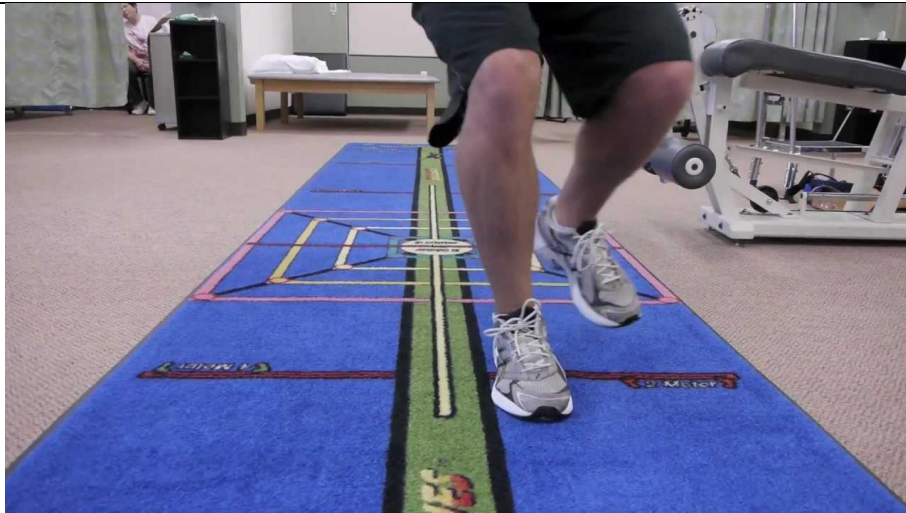


Figure 6: Demonstration of the 5 hop test. Measuring by tape measure from the backmost heel is how to measure the distance covered in the 5 hops. Diviation from the mid-line can indicate a lack of balance and co-ordination.

4. EXERCISE IS RECOMMENDED

One of the major issues for the obese person is the fact that with all that excess weight they are carrying around will be a great stress load on all their joints and the muscles supporting the joints. This in turn leads to problems with knee, hip, or perhaps spine soreness as time passes.

Flexibility training of the muscles supporting hip, knee and ankle joints is a key issue with those who are over-weight.

Getting young adults to participate in physical exercise, recreational and competitive sports such as golf which encourages such basic aerobic exercise as walking is important in the present obese world. Flexibility of the torso in general and of the

attached muscles and joints is important for people to acquire and enjoy basic golfing skills.

Likewise flexibility is needed to enjoy swimming. Swimming can be a major source of exercise for those who are over-weight. Fat tissue floats and the obese have an added advantage in the swimming pool. By developing basic muscle flexibility and the joint mobility we would open a door to the participation and enjoyment of swimming by those classified as obese.

4.1 HOME WORK EXERCISE

The composition of the home exercise corrective programme is designed to match the results of the various tests outlined previously.

The tests should enable PE teachers to establish

- 1) Those with weak hamstring flexible
- 2) Those with a difference between right and left hamstring flexibility
- 3) Individual leg strength/power through the standing long jump which is score relating to the height of each individual teenager. Basic strength/power level is achieved by a teenager being able to jump in distance length his or her own height. 5%, 10% up to 30% above one's own height indicates higher level of leg strength or power.
- 4) The hop test should enable PE teachers to establish norms for right and left leg strength, balance and co-ordination.
- 5) Depending on the overall results stretching or strengthening exercises are prescribed to enable students to be able to fulfil the aim of moving better and becoming more active

5. BENEFITS OF THE PROGRAMME

The overall benefit of this programme is to get all teenagers as active as possible during their formative years in the school's system. The subsequent aim is that good physical activity habits will remain with them during their adult years.

The off-spin should be a huge reduction in health care expenditure for the exchequer as physical active individuals are less prone to common sickness and illness.

The benefits of exercise extend far beyond weight management. Research shows that regular physical activity can help reduce one's risk for several diseases and health conditions and improve one's overall quality of life.

For younger adults the benefits include

- Overcoming obesity
- Reducing back pain
- Improvement in self esteem
- Improvement in stress management and mental health

In later life the benefits can include

- Avoidance of heart disease or stroke
- Reduction non-insulin-dependent diabetes
- Reduction in blood pressure
- Reduction in instances of osteoporosis

According to the Mayo Clinic (2016) the health benefits of regular exercise and physical activity are hard to ignore. Everyone benefits from exercise, regardless of age, sex or physical ability. The clinic suggests the following benefits:

1. Exercise controls weight
2. Exercise combats health conditions and diseases
3. Exercise improves mood
4. Exercise boosts energy
5. Exercise promotes better sleep
6. Exercise can be fun ... thus adding to one's social environment.

The investment in teenage exercise and health will prove to be a winner for this country as a nation and in terms of financial budget restriction.

PROPOSAL FOR A LARGE PILOT PLAN OF IRISH TEENAGE STUDENT POPULATION

Burns and Kilty are proposing to carry out a full three year plan of a range of sample schools in every county in Ireland. The plan involves

- 1) Carrying out the tests on every student in 40 schools in a school year and completing a follow up tests in year two and three with the same students
- 2) The Students tested will be First year to Junior Certificate students
- 3) To ensure that the tests are viable, reliable and repeatable it is proposed that the same group of testers will carry out all test for the duration of the pilot plan.

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- 4) A full report will be delivered on completion of the pilot scheme to be considered by the party/government.

PILOT SCHOOLS

Every county is to be represented in the project.

City, town and rural schools are all included.

We will aim to have an equal divide between male, female and mixed schools

An even spread of provincial schools are catered for.

The following sample would indicate the sample school areas for the pilot study.

CITY SCHOOLS: 9

One school from each of these city areas:

- Tallaght area
- Clondalkin area
- Ballymun/Santry area
- Blackrock/Dun Laoghaire area
- Cork North City area,
- Cork South City area
- Galway
- Waterford
- Limerick

3 boys schools, 3 girls schools, 3 mixed schools

TOWNS: 21

- Sligo
- Roscommon,
- Carrick-on-Shannon,
- Castlebar
- Tralee
- Clonmel
- Ennis,
- Dungarvan
- Cavan
- Monaghan
- Letterkenny
- Athlone
- Drogheda
- Navan,
- Wexford,
- Kilkenny,
- Carlow,
- Newbridge,
- Tullamore,
- Portlaois,
- Bray.

7 boys schools, 7 girls schools, 7 mixed schools

LARGE TOWNS SERVING WIDE RURAL 10

- Portumna
- Claremorris:
- Killenaule
- Doon
- Abbeyfeale:
- Carrickmacross
- Donegal Town
- Kells
- Bagnalstown
- Portarlinton.

All mixed schools if possible,

QUOTATIONS OF INTEREST

1.

According to New Jersey Medical School's Archives of Physical Medicine and Rehabilitation (Volume 77, pp 1139-1143, 1996), increasing one's flexibility reduces injuries. They tested the flexibility of leg tissues, muscles and hips of 200 college athletes at the start of their sports season. These athletes were monitored for a number of months.

The results of this research found that the likelihood of injury to the male athletes reduced as their flexibility increased. A 10 point ligament flexibility scale was used and the risk of injury decreased by approximately 15% for each 1 point increase in flexibility. Also, for each one point increase in muscle tightness,

the likelihood of injury rose by more than 20%!

Results for female athletes differed to males. Flexibility and their risk of injury was not related. Tests found that females were more flexible than men. They also had less injuries, with the most flexible female athletes having 60% less injuries than males.

(New Jersey Medical School's Archives of Physical Medicine and Rehabilitation, 1996)

2.

“Regular stretching can improve your flexibility by 10-15 per cent in just four to six weeks” **(Research Quarterly for Exercise and Sport)**

3.

“Weak muscles and lack of flexibility are primary causes of knee injuries.”
(The Mayo Clinic)

4.

"I think clearly this would be a good device for objectively measuring straight leg raising test which is a good indicator of hamstring problems and hamstring tightness, and also of nerve root tension for the lower lumbar spine.

The big role I would see for this is in assessing people at the beginning, during and as they are progressing through the year. If you are able to get significant numbers measured like this, you may well be able to indicate that people who have tighter hamstrings are more likely to get either primary or secondary problems from hamstrings tightness and indeed if they improve their hamstring flexibility that they reduce it."

(Paraic Murray, Consultant Orthopaedic Surgeon, The Galway Knee Clinic)

5.

"The Speed flexer is a unique product and a very welcome addition to any coach, PE teacher, personal trainer or fitness advisor. Flexibility is an important aspect of fitness training and injury prevention. Previous to the launch of this product, flexibility was only usually addressed after injury had occurred. However with the greater awareness of hamstring and lower back flexibility and especially the imbalances that can occur in young athletes, flexibility can become an equally important aspect of the athletes development.

In the secondary school context this product has created a great awareness of the need for developmental stretching programmes for the adolescent athlete. Having seen first hand the imbalances that can occur and the generally poor flexibility amongst even elite athletes, many students realised the positive effect good bilateral

flexibility can have regarding injury prevention, speed development and skill execution in sports. I can see this product being of invaluable use over the years both in physical education and extra-curricular provision in Holy Rosary College and with my club Corofin GAA."

(Aidan Donnellan, Physical Education teacher and Gaelic football coach Holy Rosary College Mountbellew, 2012)