# THE WORLD OF LES MILLS™ RESEARCH

We love the fact that our studies make a REAL difference to people's lives. Thanks to you instructors, we're able to bring science out of the lab and deliver it into the community with immediate effect.

There are three reasons we invest into research:

1. Give instructors confidence in the validity and science behind our programs
2. Test and tweak our products so that they're better than ever
3. Publish research that can be peer reviewed in scientific journals – therefore giving group fitness the credibility it deserves

## CXWORX™

Our first published study was conducted by our team at Penn State University under the guidance of Dr Jinger Gottschall, and was instrumental in the design of our CXWORX™ program. We measured the effect of integrated core exercises – such as Hovers and Planks – against the more traditional types of abdominal exercises – such as Crunches. This study conclusively demonstrated the ability of integrated core exercises to produce superior muscle gains and functional core strength; that's why these exercises form a big part of CXWORX™ and are often included in the core conditioning tracks of our other programs.

## GET FIT TOGETHER

The Get Fit Together study investigated the effectiveness of LES MILLS™ Group Fitness classes on sedentary individuals. Twenty-five adults were selected to complete 30 weeks of exercise. However, instead of the usual approach of delivering these sessions in a lab, the participants joined workouts from a live class timetable. For their cardio component we used RPM™, BODYATTACK™, BODYSTEP™ and BODYCOMBAT™, for strength training we used BODYPUMP™, and for flexibility we used BODYBALANCE™/BODYFLOW®.

The results were amazing! We dramatically lowered the risk of cardiovascular disease of those involved AND got them hooked into fitness. We also uncovered the secrets of how to gradually introduce new people into our classes so that they could fall in love with fitness, without the fear of not being able to keep up in the first few weeks; identifying and controlling these factors is crucial when getting new people engaged in exercise.

## LES MILLS GRIT™ SERIES

High Intensity Interval Training (HIIT) is riding a wave of popularity. Numerous studies have clearly demonstrated the value of this type of training and its ability to change body composition, increase $VO_2$ and reduce the risk of cardiovascular disease in a very short space of time.

The LES MILLS GRIT™ Series is taking these benefits out of the lab and delivering them where they are needed the most – into the community. The results of 2 great studies clearly show that LES MILLS GRIT™ is delivering on the HIIT promise. The first of these measured the effects on a group of active adults. They participated in LES MILLS GRIT™ twice a week, for a period of 6 weeks. The LES MILLS GRIT™ group had 2 – 3 times the changes in cardiovascular risk factors, strength gains and changes in body composition when compared to a control group who continued with their normal training. Just 2 LES MILLS GRIT™ classes per week was enough to transform their fitness.

The second study looked at the application of LES MILLS GRIT™ in an elite women's soccer team who used the workouts in their pre-season training. Once again we saw significant changes in body composition and fitness levels in just 6 weeks – proving its effectiveness in athletes.

## BODYPUMP™

Since its creation in 1991, this program has been delivering the benefits of resistance training to a multitude of people who would otherwise be too intimidated or just not interested in training in the weights room. We decided to put BODYPUMP™ under the microscope, looking at 2 key areas affected by resistance training – bone health and muscle activation. Our team at Penn State was responsible for recruiting a group of inactive participants and guiding them through 6 months of BODYPUMP™, measuring their bone density pre- and post-trial. By the conclusion of the study, participants had each significantly increased the bone health in their arms, trunk, pelvis and spine. Publication of this study is sure to have a huge impact on the prevention and management of osteoporosis, since it was previously thought that much heavier weights than those utilized in BODYPUMP™ are needed to observe these changes in bone density.

So how does BODYPUMP™ compare to conventional resistance training when it comes to muscle activation? The team at Penn State put THE REP EFFECT™ to the test. They compared the energy output of lifting heavier weights for less reps to lifting lighter weights with more reps. Both conditions were matched for work output, ie the heavier weights for less reps was an exact equivalent in terms of work, to the lighter weights with more reps. The results showed the full benefits of THE REP EFFECT™: the cost on working muscles was HIGHER with less weight for more reps.

Check out www.lesmills.com/research for more details on all these studies.

## THE FUTURE

Les Mills International is looking to liaise with research facilities around the world as we test and promote the benefits of group fitness, ensuring that we remain at the cutting edge of sports science. We're engaging global teams to investigate the effects of RPM™, BODYVIVE™, BODYBALANCE™/BODYFLOW®, and BORN TO MOVE™.

Les Mills would like to say THANK YOU to our amazing team of researchers and instructors at Penn State and to you, our instructors, all over the world. It's really due to your hard work, passion and commitment that we are able to make such a difference to the health and fitness of the global community.

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# STRENGTH TRAINING PRINCIPLES TO TEACH BODYPUMP™ BETTER – THE CLEAN & PRESS

**The purpose of this Education session is to develop our knowledge of Layer 2 Cues for the Clean & Press. This full-body movement is both dynamic and explosive – powerfully combining speed with strength. Check out Bryce and Glen on the DVD for a visual demonstration of the muscle recruitment involved.**

## BENEFITS OF THE CLEAN & PRESS

1. All the major muscle groups are targeted
2. Recruitment of the posterior chain: hamstrings, glutes and lower back
3. We improve inter-muscular coordination – the interaction between the major muscles of the ankles, knees and hips
4. The fast speed of the movement causes an immense amount of muscle activation accessing our type II muscle fibers
5. This form of training is great for functional strength and athletic movements such as running, jumping, throwing and sprinting

So now we know WHY we do this movement, let's take a closer look at HOW it should be executed:

## YOU NEED TO MOVE THE BAR FAST

The first phase of movement initiates the upward lift of the bar. This is produced by powerfully straightening the knees and extending the hips. You can also add a slight heel lift here to get the bar moving.
As the bar moves up the body, the traps have to fire explosively, in conjunction with the legs, to accelerate the bar upward with enough force to enable you to jump underneath the bar. This requires a coordinated action of the posterior chain, the traps and the core muscles. By the time the bar reaches the lower chest, it should have enough vertical drive from these big muscles to enable you to flick the elbows under and use your Squat to clean the bar to the front of the collar bones.

## KEEP THE BAR CLOSE TO THE BODY

Failure to use an explosive Catch and Squat can result in excessive shoulder stress. Participants will often substitute this with a Reverse Curl action, meaning they incorrectly use the much smaller shoulder rotators – and these loads are far too big for these small muscles. We must keep the bar close to the body; this also makes it much easier to maintain core stability in a neutral spine.
To perform the Overhead Press, we drive the bar vertically upward from the Clean position. This will mean the elbows remain slightly forward at the top. We need a strong ab brace here to avoid over-extending the trunk.
The last piece of the puzzle concerns the thoracic spine. Remember: lifting the chest flattens the thoracic spine, creating the best platform from which to lift the bar overhead.

## COACHING THE CLEAN & PRESS

**Now we understand the science behind the movement, let's apply it to our coaching in class:**

### LAYER 1 – Position/Execution

Start with a strong SET position:
- Heels under hips
- Chest up, abs braced
- Hands thumb distance from the thighs
- Knees slightly bent

Then teach people how to execute the move:
- Straighten the knees
- Pull the bar to lower chest, elbows above the bar
- Drop under the bar and bend the knees
- Drive the bar above the head using the legs
- Brace the abs when the bar is above the head

### LAYER 2

Once all participants are doing the move, use cues that will get them really feeling the power of the Press. This is the time to use your voice in a direct, dynamic way to drive the energy of the movement:
- Bar tight to the body to activate the upper back and lats
- Pull your T-shirt up so the bar travels in a straight line
- Drop into the Squat to catch the bar
- Sit back into the Squat
- Jump under the bar for explosive power
- Fast elbows
- Drive the heels through the floor, power the bar overhead
- Think about pushing the bar through the roof

## THE KEY POINTS

**Layer 1:** Make sure you set everybody up into a strong body position, ready to drive and push the bar.

**Layer 2:** Once they are executing the move well, focus on delivering 1 or 2 powerful Follow-up Cues to enhance the intensity, muscle activation and feel.

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# BODYPUMP™ THE REP EFFECT™

THE REP EFFECT™ allows us to get all the benefits of resistance training without lifting heavy weights. It's the key to developing long lean muscles, and it's also getting rid of some of those weight-training myths. Unbelievably, findings from the Center of Disease Control and Prevention in the United States report that *less than 20% of adults* regularly do the recommended two resistance training sessions per week.

The truth is you can develop toned, lean muscle without lifting heavy weights and getting bulky… that's the Les Mills secret formula behind THE REP EFFECT™.

THE REP EFFECT™ is the reason Les Mills' BODYPUMP™ is still the fastest way in the universe to get – and stay – in shape. It uses the effect of high repetitions with much less weight to fatigue the muscles – and it's muscle fatigue, *not muscle load,* that tones and strengthens.

**TRADITIONALLY, WE'VE ALWAYS KNOWN THAT HIGH-REP TRAINING IMPROVES STRENGTH ENDURANCE, CREATING TONED MUSCLE WITHOUT BULK.**

High-rep training produces more protein synthesis in muscle (that's how you create muscle tone) than traditional heavy weight training.[1]

In your average BODYPUMP™ class, you perform around **800** repetitions in a single workout – *more than four times as many as you would in a regular gym workout!* And we separate the class into tracks, with every 70 to 100 reps per track focused on a different body part.

So this achieves two types of fatigue – isolated fatigue of each track's target muscle group and an accumulation of fatigue by the time you've finished the class. And if you want long lean muscles, fatigue is a good thing. The length of the class and the fact that your heart rate remains elevated, also means you get a cardiovascular workout so you're burning fat at the same time you're shaping and toning muscle – double the bang for your buck!

Les Mills carefully designs each BODYPUMP™ track using things like tempo changes to fatigue the different fibers in your muscles in different ways. This maximizes THE REP EFFECT™ and it's unique.

Some fibers work better with slow tempos and other fibers work better with faster tempos. By changing the pace up and down we're not just keeping the workout interesting, we're making sure we activate *all* the fiber types in your muscles.

Then we use different ranges of motion – take Bottom Halves, where you're sitting at the bottom of a Squat. They build pressure in the muscle by taking away the release you would normally get at the top of the movement.

This is called occlusion training and it's a great way to generate more fatigue with less load.[2] And recently we've added some propulsions into the Lunges track.

Propulsions are an explosive movement using all your fast-twitch muscle fibers and they really push your heart rate up and burn fat.

**SO BY THE END OF A BODYPUMP™ CLASS YOU'VE EXHAUSTED EVERY MUSCLE GROUP… AND ALL THE DIFFERENT FIBERS WITHIN EVERY MUSCLE GROUP…**

You've pushed your heart rate into a cardiovascular training zone, you've toned and strengthened, you've burned fat, and hopefully you've had some fun along the way.

And that's THE REP EFFECT™. Tone not bulk. High reps not heavy weights. Encouraging not intimidating. Resistance training that anyone at any age and any level of fitness can do – enjoy – and see the effect.


1. Burd N., Low-Load High Volume Resistance Exercise Stimulates Muscle Protein Synthesis More Than High-Load Low Volume Resistance Exercise in Young Men, PLoS One, August 2010, Volume 5, Issue 8, e12033
2. Wernbom M., Ischemic strength training: a low-load alternative to heavy resistance exercise? Scand J Med Sci Sports 2008: 18: 401–416


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