“Personalizing Exercise for Your Cancer Care“ (Rob Newton, PhD, DSc) [#164]

Brad Power
October 8, 2025

“Patients who are more physically active have less risk of recurrence. They survive longer, overall, which is not surprising. Anyone who is physically active is likely to live longer. But more particularly, we see that their cancer-specific survival is greatly enhanced.
We never knew before this fantastic study, called the CHALLENGE trial, whether it was a reverse causation. In other words, that association was the fact that patients who were doing better, feeling better, were more likely to survive, and they also did more physical exercise. Now we have very solid evidence in a very large trial to show a direct causative drive, and this is in a randomized controlled trial. That study was presented at the American Society of Clinic Oncology in Chicago in the middle of this year. It really made people sit up and listen, particularly the oncology community, about the power of exercise as medicine to treat cancer. Increasingly targeted exercise is being established as a first line treatment. It's not a ‘nice to have’. It's not something that you just say, ‘I'll talk to your patient.’ ‘It'd be great if he did some more walking, or if he played a bit more golf.’ It's much more nuanced than that. We're realizing that it's absolutely essential as a component of the overall care of the patient, and the evidence now is that it enhances the effectiveness of mainstream cancer treatments.” – Rob Newton, PhD, DSc

“We need to stop talking about fitness. We need to talk more about the internal mechanisms of the levers that we are adjusting and tuning to produce a more cancer-suppressive environment, or to enhance the effectiveness of a treatment, or to reduce the side effects. More so than just, ‘Are they fitter?’ Having higher cardio respiratory fitness is nice, and it is related to survival, but I'm not sure that's the actual medicine.” – Rob Newton, PhD, DSc

“We now know that muscle tissue is a major endocrine organ, and it's signaling to all the other tissues in the body. In particular, our muscle tissue is a major moderator of signaling to our immune system and modulating the effectiveness of our immune system. So if a patient has low muscle mass, they have dramatically compromised immune capacity, and of course, this is a major issue in trying to fight their cancer.” – Rob Newton, PhD, DSc

Meeting Summary

Cancer treatment is episodic and focussed mainly on treatments such as surgery, chemotherapy, and radiation therapy. While these treatments can be lifesaving, truly integrative oncology encompasses other treatments and therapies as well. Exercise medicine, nutrition therapy, and psychological support are major pillars of cancer care, but access can be limited. Fortunately, quality research is accumulating providing clear evidence that these “adjunct” treatments extend survival, enhance quality of life, facilitate the primary treatments while reducing their side effects, and reduce risk of recurrence. As a result, access is opening up with more and more hospitals and cancer centers providing more extensive integrative oncology, including treatment in the home utilizing the greatly expanded capacity of the Internet and virtual health care due to Covid19.

“Personalizing Exercise for Your Cancer Care“ (Rob Newton, PhD, DSc) [#164]

Rob Newton, PhD, DSc, is uniquely qualified to lead a discussion on personalizing exercise medicine to complement traditional cancer care. He is Professor of Exercise Medicine in the Exercise Medicine Research Institute that he established (2004) at Edith Cowan University, Perth, Western Australia. His current major research directions include: exercise medicine as neoadjuvant, adjuvant, and rehabilitative cancer therapy to reduce side-effects and enhance effectiveness of surgery, chemotherapy, and radiation therapy; the influence of targeted exercise medicine on tumor biology, and exercise medicine for enhancing survival and reducing decline in quality of life, strength, body composition and functional ability in cancer patients.

What is personalized exercise for cancer care?

- Extensive individual assessments of body composition, metabolic factors, immune capacity, inflammatory status, gut microbiome, and psychological health
- Highly personalized exercise prescriptions that are dynamically adjusted based on your specific cancer type, treatment, and individual response
- Using advanced technologies like wearable sensors and AI to monitor and optimize the exercise intervention
- Focusing on changing internal physiological mechanisms to create a more cancer-suppressive environment
- Integrating exercise with nutrition and psychological support
- Continuously reassessing and adapting the exercise plan to enhance treatment effectiveness, reduce side effects, and improve patient outcomes

Should you consider personalized exercise as part of the treatment for your cancer?

A recent New England Journal of Medicine study demonstrated a causative link between exercise and improved cancer survival.

Exercise personalized to your cancer type, treatment, and physical condition can:

- Enhance the effectiveness of traditional treatments like chemotherapy and radiation
- Reduce side effects of cancer treatments, such as fatigue related to radiation therapy
- Improve overall survival and cancer-specific survival
- Help create a more cancer-suppressive internal environment

What are examples of personalizing exercise to your situation?

- **If you have low muscle mass**: prioritize high-volume resistance training, focus on large muscle groups and compound movements, use eccentric exercise techniques, maintain energy balance (not a deficit), and limit aerobic exercise to optimize muscle growth
- **If you are getting radiation therapy**: Perform moderate-intensity aerobic exercise immediately before radiation treatment, aim to increase blood flow to the tumor, use

precise cardiac output and optimal metabolism, to enhance tumor perfusion and radiation effectiveness
- **If you are on androgen deprivation therapy**: Use specialized resistance training techniques, emphasize muscle preservation, modify exercise to compensate for testosterone suppression

What are the standard exercise targets and how should you vary from them?

- The standard exercise recommendation is 75 to 150 minutes of moderate to vigorous aerobic exercise, two or more resistance training sessions, and some balance training each week. This is effective for cancer survivors who are relatively well and not undergoing treatment..
- However, these generic guidelines are insufficient and in some cases contraindicated for cancer patients. The approach should be tailored to your individual situation, treatments, health issues, and changing conditions.

How can you measure progress from exercise interventions?

Measuring progress isn't just about fitness metrics, but understanding the underlying physiological changes that create a more cancer-suppressive environment and enhance treatment effectiveness.

- A “**DEXA scan**”: a quick, painless, low-dose X-ray scan, can assess your muscle mass, fat distribution, and bone density
- **Your observations**: including your psychological state, anxiety levels, depression indicators, and concerns
- **Blood tests:** which can analyze your “myokine” (proteins released by muscle cells that act as signaling molecules in the body) levels, inflammation markers, immune cell health, and overall blood cell count
- **Wearable devices**: to track your physical activity characteristics, sleep quality, changes in your physiological state, heart rate variability, oxygen saturation
- **Functional performance assessments**: strength measurements, your ability to perform daily living tasks, control movements, maintain posture, and generate force

Should you consider blood flow restriction training?

- Blood flow restriction training could potentially help you build muscle with lower mechanical stress, especially if you have limitations or injuries.
- However, it has limitations: while it can help build some muscle mass, it lacks functional transfer and neural learning.
- It's most useful if you are struggling to do standard resistance training, but may not be widely accessible due to the specialized equipment and expertise required.

How can you learn more about precision exercise in cancer?

“Personalizing Exercise for Your Cancer Care“ (Rob Newton, PhD, DSc) [#164]

- Follow research from Rob Newton's Exercise Medicine Research Institute at Edith Cowan University
- Contact Rob Newton at rob@fitmed.com
- Read recent publications in exercise and cancer care
- Attend conferences and webinars focused on exercise and cancer care
- Consult with clinical exercise physiologists specializing in cancer care
- Explore digital platforms and resources that provide personalized exercise guidance for cancer patients
- See previous discussions we have had on exercise and cancer care:
    - “Designing the Right Exercise Program for Your Cancer Situation” (Kathryn Schmitz, PhD, MPH) [#157]
    - “Exercise to Boost Your Immune System to Fight Cancer” (Dr. Tom Incledon) [#49]
    - Adding Exercise for Everyday Life and Developing a Medical Device to Personalize Cancer Treatment (Cathy Skinner) [#47]
    - “Exercise as a Countermeasure to Hormone Deprivation Therapy Side Effects and for Bone and Mental Health” (Kerri Winters-Stone) [#48]
    - “Exercise and Cancer Development and Progression" (Lee Jones, PhD) [#143]
    - “How Daily Lifestyle Interventions Improve Your Cancer Outcomes” (Amanda Grilli) [#158]

For the video recording, please see here.

“Personalizing Exercise for Your Cancer Care“ (Rob Newton, PhD, DSc) [#164]

Meeting Notes

KEYWORDS

Cancer, exercise oncology, personalized exercise, exercise medicine, cancer therapy, survival impact, randomized control trial, targeted exercise, immunotherapy, muscle mass, fat mass, bone metastases, precision exercise, digital solutions, patient assessment, exercise prescription, cancer suppression.

SPEAKERS

Rob Newton (83%), Roger Royse (5%), Rick Davis (4%), Ken Martin (2%), Russ Hollyer (2%), Jeff Dwyer (2%), Gary Peters (2%), David Plunkett (<1%)

CHAT CONTRIBUTORS

Russ Hollyer, Rick Davis, Ken Martin, Gary Peters, DS, Helen, Vita Riera, Wee Kian, Jeff Marchi, Claire, Kajal Gokal, Brad Power

SUMMARY

Rob Newton, PhD, DSc, discussed the transformative impact of exercise on cancer care, emphasizing its role as a first-line treatment. He highlighted a randomized control trial recently published in the New England Journal of Medicine showing exercise significantly improves survival of patients with colon cancer Newton's research at Edith Cowan University in Perth, Western Australia, demonstrated exercise's effectiveness in enhancing chemotherapy and radiation therapy. He stressed the importance of tailoring exercise in cancer care to individual patient needs, and the potential of digital solutions to scale up personalized care. Challenges include funding and workforce capacity, but advancements in technology and standardization are expected to improve access and outcomes.

OUTLINE

Introduction to Personalized Exercise for Cancer Patients

- Rob Newton, PhD, DSc, discussed personalizing exercise to complement traditional cancer care.
- The New England Journal of Medicine paper published in June showed a causative impact of exercise on survival.
- The paper, led by Professor Kerry Courneya, was the first randomized controlled trial to demonstrate a direct causative effect of exercise on survival.
- The study showed patients who were more active had less risk of cancer recurrence and survived longer.
- The study established targeted exercise as a first-line treatment for cancer, not just a nice-to-have.
- Exercise can enhance the effectiveness of mainstream treatments like chemotherapy and radiation therapy.
- Rob’s Research Institute in Perth, Western Australia, is conducting research on enhancing the effectiveness of radiation therapy through targeted exercise.

“Personalizing Exercise for Your Cancer Care“ (Rob Newton, PhD, DSc) [#164]

- Targeted exercise can help in immunotherapy treatments, particularly for patients with multiple myeloma.
- There is a solid treatment plan for patients from initial chemotherapy to the course of immunotherapy.

Personalized Exercise Research

- A study on targeted exercise for men with metastatic prostate cancer, led by Professor Newton and Professor Fred Saad, recruited 154 patients across 14 trial sites in 10 countries.
- The study aimed to demonstrate a causative relationship between targeted exercise and survival in men with metastatic prostate cancer.
- The study involved high-intensity resistance training, moderate-intensity continuous training, and high-intensity interval training.
- The study was supervised to ensure safety, and adverse events were monitored.
- The study showed that these patients with stage 4 cancer including bone metastases could undergo moderate to vigorous exercise safely.
- Myokines play a role in suppressing cancer growth and enhancing immune function.
- The study showed a 20% reduction in cancer cell growth in-vitro after six months of exercise.
- Further, each exercise bout produced a further burst of cancer-suppressing myokines.

Precision Exercise Interventions

- The components of a precision exercise intervention include body composition, metabolic and cardiovascular factors, and immune capacity.
- An intervention includes extensive biological health and fitness assessments, integration of wearable sensors, and individualized exercise prescriptions.
- Ongoing monitoring and reassessment adapt the exercise prescription.
- Digital solutions can scale up precision exercise cancer care and make it accessible to more patients.

Patient Education and Support

- Patient education to understand the underlying mechanisms of exercise is important.
- Exercise is a tool to create a more cancer-suppressive environment and enhance the effectiveness of treatments.
- Comprehensive assessments and tailored exercise prescriptions are needed to improve patient outcomes.

Challenges and Future Directions

- Rick Davis raised concerns about the practical application of precision exercise oncology and the need for standardized data.
- Jeff Marchi asked about the appropriateness of his current exercise routine and the potential risks of overexercising.
- Ken Martin discussed the need for standardized measures and protocols in exercise oncology.
- There are ongoing efforts to standardize data and integrate it with electronic health records.

“Personalizing Exercise for Your Cancer Care“ (Rob Newton, PhD, DSc) [#164]

- Gary Peters asked about the challenges of accessing high-quality exercise programs and the risks of injury.
- The workforce needs upskilling.
- Leveraging digital technologies can provide remote support.

“Personalizing Exercise for Your Cancer Care“ (Rob Newton, PhD, DSc) [#164]

TRANSCRIPT

Roger Royse
Welcome to the Cancer Patient Lab.

Today we have Rob Newton, PhD, DSc. He is going to lead a discussion on personalizing exercise to complement traditional cancer care. Rob is the Professor of Exercise Medicine in the exercise Medicine Research Institute that he established in 2004 at the Edith Cowan University in Perth, Western Australia. His research includes exercise medicine as neoadjuvant, adjuvant, and rehabilitative cancer therapy to reduce side effects and enhance effectiveness.

We're going to learn all about what exercise medicine is, how it's a first line treatment for cancer, what it means, etc.

“Personalizing Exercise for Your Cancer Care“ (Rob Newton, PhD, DSc) [#164]

Precision Exercise Medicine in the Treatment of Cancer

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Exercise Medicine Research Institute 1

Rob Newton 0:53

“Personalizing Exercise for Your Cancer Care“ (Rob Newton, PhD, DSc) [#164]

I'm very excited about this particular chat today, because I think things have changed dramatically in the last two to three months, and interest is really starting to accelerate around this field, and it all was kicked off with the New England Journal of Medicine paper, which was published in June this year. It's led by Professor Kerry Courneya out of the University of Alberta, Canada, and this was the first randomized control trial to show a causative impact of exercise on survival. We've had many studies with literally thousands of patients which have shown association with exercise but this is the first demonstrating causation.

Patients who are more physically active have less risk of recurrence. They survive longer, overall, which is not surprising. Anyone who is physically active is likely to live longer. But more particularly, we see that their cancer-specific survival is greatly enhanced.

We never knew before this fantastic study, called the CHALLENGE trial, whether it was a reverse causation. In other words, that association was the fact that patients who were doing better, feeling better, were more likely to survive, and they also did more physical exercise.

Now we have very solid evidence in a very large trial to show a direct causative drive, and this is in a randomized controlled trial. That study was presented at the American Society of Clinical Oncology in Chicago in the middle of this year. It really made people sit up and listen, particularly the oncology community, about the power of exercise as medicine to treat cancer.

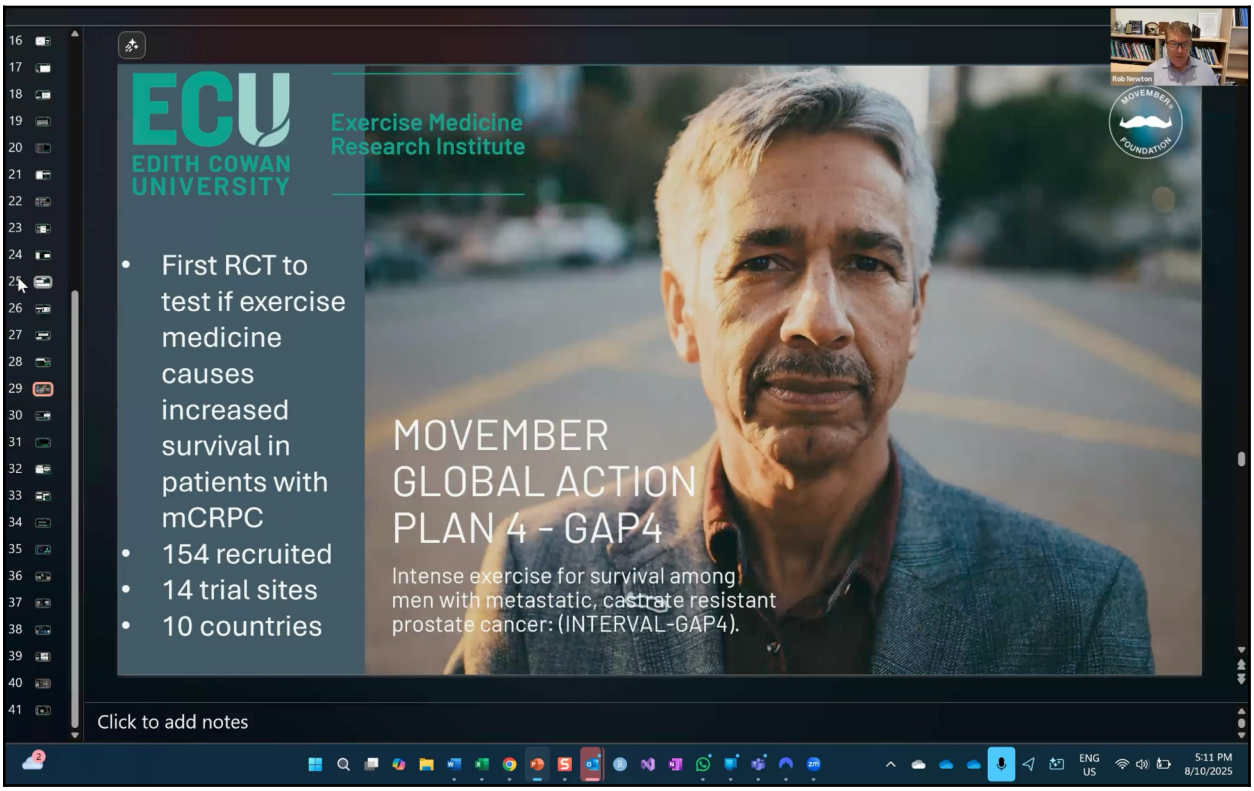
It's established targeted exercise as more of a first line treatment. It's not a “nice to have”. It's not something that you just say, “I'll talk to your patient.” “It'd be great if he did some more walking, or if he played a bit more golf.” It's much more nuanced than that. We're realizing that it's absolutely essential as a component of the overall care of the patient, and the evidence now is that it enhances the effectiveness of mainstream treatments.

We definitely see clear mechanistic drives for exercise to improve the effectiveness of chemotherapy. For example, our own lab, our own institute in Perth, Western Australia, we're showing some very nice research there where we're enhancing the effectiveness of radiation therapy through targeted exercise.

As we see the holy grail of immunotherapy become more understood – it's had fantastic success in cancers such as melanoma and some blood cancers, but limited effectiveness in some of the solid tumors, like the more common ones of prostate and breast – medical science will overcome those hurdles and will move forward. There is a critical role for targeted exercise throughout the course of immunotherapy treatment for the patient.

I had some very good discussions last week in Cologne with a group there. The hospital is doing some leading edge research in immunotherapy for patients with multiple myeloma, and we've mapped out a pretty solid treatment plan to take those patients right from their initial recommendation of chemo, of immunotherapy, right through the course of immunotherapy. So. It's a very exciting time, and things are changing rapidly and advancing rapidly. Which is fantastic for the patients.

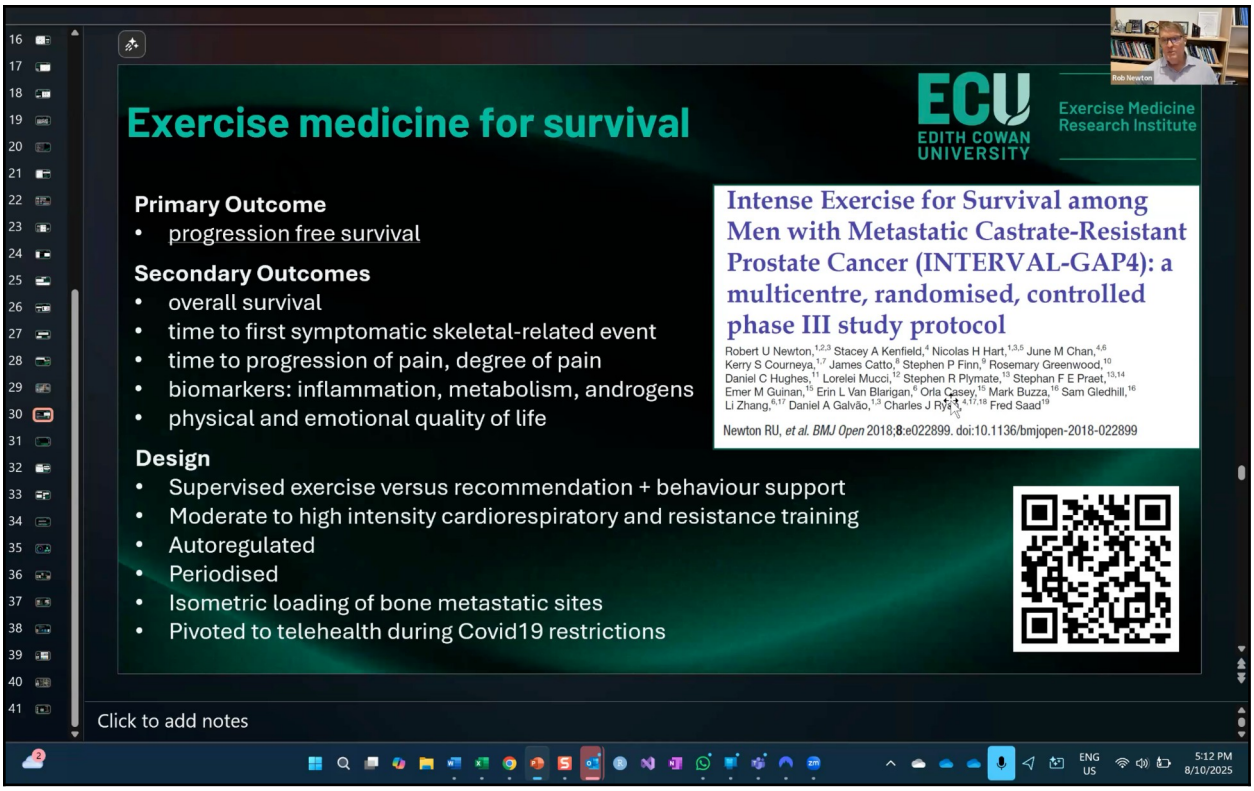
“Personalizing Exercise for Your Cancer Care“ (Rob Newton, PhD, DSc) [#164]



Rob Newton 6:10
I'm going to lead off with a study, which we're just in the process of finalizing. We've completed recruitment, and the patients have all been through the intervention, and we have a two year follow up, and we are just finishing the last patients to go through that follow up trials being led by our team, along with Professor Fred Saad, who's a top urologist based in Montreal, Canada.

Similar to the CHALLENGE study that I just mentioned, this is the second major study to look at an actual randomized controlled trial to demonstrate whether or not there is a causative relationship between targeted exercise and survival. In this case, it's men with metastatic prostate cancer, and this was funded by the Movember Foundation and recruited 154 patients across 14 trial sites in 10 countries.

“Personalizing Exercise for Your Cancer Care“ (Rob Newton, PhD, DSc) [#164]



There's the protocol paper for you there, but the reason why I raised this particular trial is it was a fairly ambitious trial, and we really cast aside the idea of "gentle exercise for people with cancer. These men have stage four cancer. They may have been on ADT (androgen deprivation therapy) for 10 or 15 years. Their disease has metastasized. In the main it has spread to their skeleton, and currently we have no cure for metastatic prostate cancer, and they're now undergoing what we call super anti-androgens. They're on ADT (androgen deprivation therapy), which suppresses the production of testosterone, but they're also on ARPIs, so androgen receptor inhibitors, and this means that the cells are then blocked from any remaining testosterone. They're blocked from that binding then.

Whilst this does slow the disease markedly, of course, it has a catastrophic effect on the body, and as Brad mentioned earlier when we were chatting, in particular, the loss of muscle mass. We know that, according to many studies, that there's a strong relationship between low muscle mass and cancer-specific survival. This has been demonstrated in breast cancer, colon cancer, prostate cancer and others.

We now know that muscle tissue is a major endocrine organ, and it's signaling to all the other tissues in the body. In particular, our muscle tissue is a major moderator of signaling to our immune system and modulating the effectiveness of our immune system. So if a patient has low muscle mass, they have dramatically compromised immune capacity, and of course, this is a major issue in trying to fight their cancer.

For these men, low muscle mass, they also tend to have high fat.

Rob Newton 9:48
So these men have been through a lot of treatment. When we proposed the study, the median survival was only 33 months. We powered the study to be able to push this out to 40 months. And to do that, this couldn't be a general exercise intervention. We had to throw all of the best exercise physiology knowledge that we had at this study and try to turn this around. It was directly supervised with the patient versus the control group, which received a recommendation to exercise and behavior support.

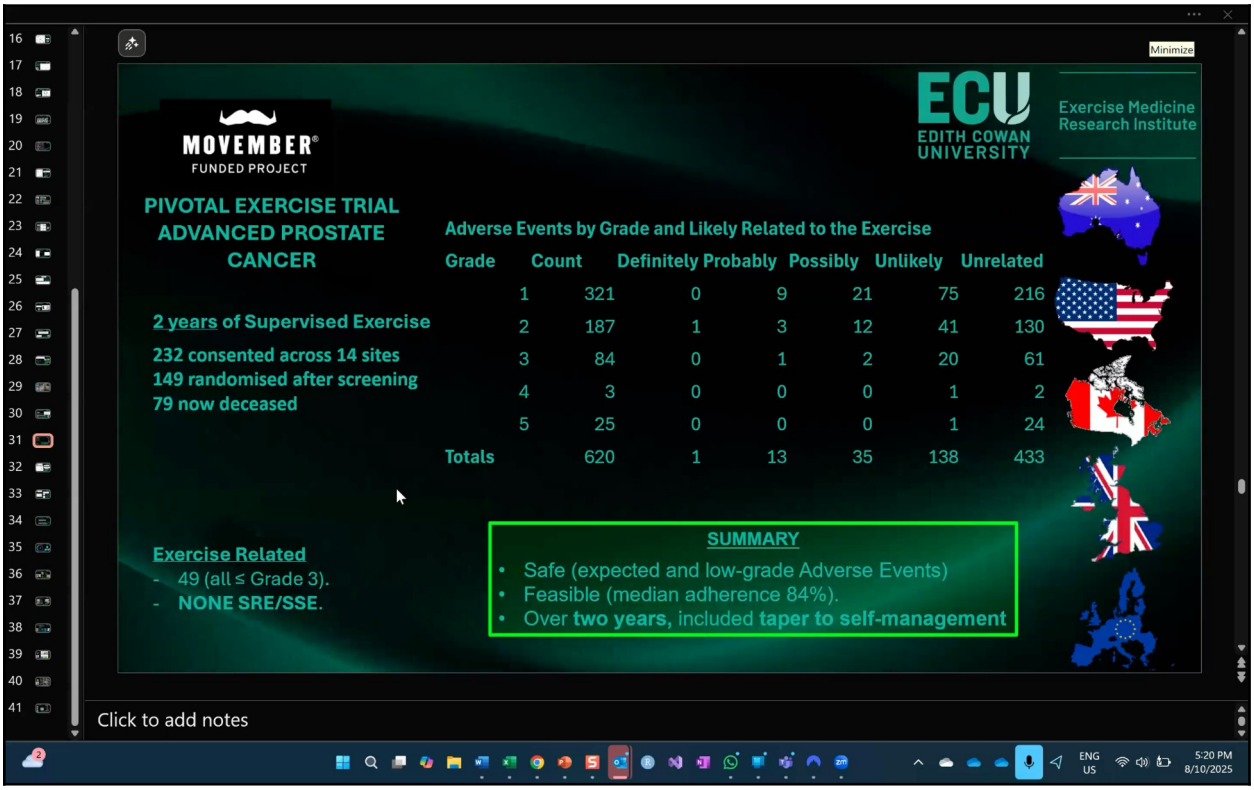
Now remember that at this stage, it was not known whether the exercise intervention would work, and secondly, what the safety would be like in terms of this intervention, because this was high intensity resistance training. So these patients were lifting weights anywhere between a weight they could lift six to maybe 12 times. So it was relatively heavy. They were doing moderate intensity continuous training, and also HIIT training, which is high intensity interval training. It was an intense training program of a relatively high volume, because we had to turn this around. We had to find a way in which we could hold muscle or increase muscle mass on these patients.

It was auto-regulated. What that means is that as the patient came into the clinic, we would ask them how they were feeling, and this is used routinely in professional sport, but we applied that same thinking to the patients. So if they presented and they were feeling really, really flat, but we had something programmed, which is a little bit intense, then we might moderate it down. If they're feeling really unwell, really fatigued, then we might say, “Look, let's just do some recovery work,” for example. But if they came in and they were feeling really sharp, then we'd take it up a notch and look at some quite high intensity resistance training.

It was also periodized. This is relatively novel in cancer exercise. What does that mean? Well, we've been periodizing athlete preparation and training for probably two millennia, but we haven't been applying it in the clinical setting. What this means is that we cycle the intensity and volume of exercise and the type of exercise across the week, four week periods, and 12 week periods. For example, across the week, perhaps on Monday, we'll have a high intensity, high load session. Wednesday, we'll go back down to a light load, and then on Friday, we'll bump it back up to a moderate load. We cycle that across the week. We then cycle again across a four-week period, altering emphasis on aerobic versus strength training, altering the intensity, the volume of training, and also across 3-month or 12-week periods. We also periodize it around events, so if the patient is coming up for chemotherapy, for example, and some of the men did in this study were on chemo and we also do it routinely in clinical practice, is that we would intensify the exercise medicine leading up to the day before chemotherapy, and then once they have chemotherapy infusion, we then drop it back down to allow them recover and then build back up again.

We also used isometric loading of bone “met” (metastatic) sites. It wasn't so long ago that patients with bone “mets”, where the cancer has metastasized to their skeleton, were advised not to exercise. In particular, they were advised not to do any resistance training or lift anything

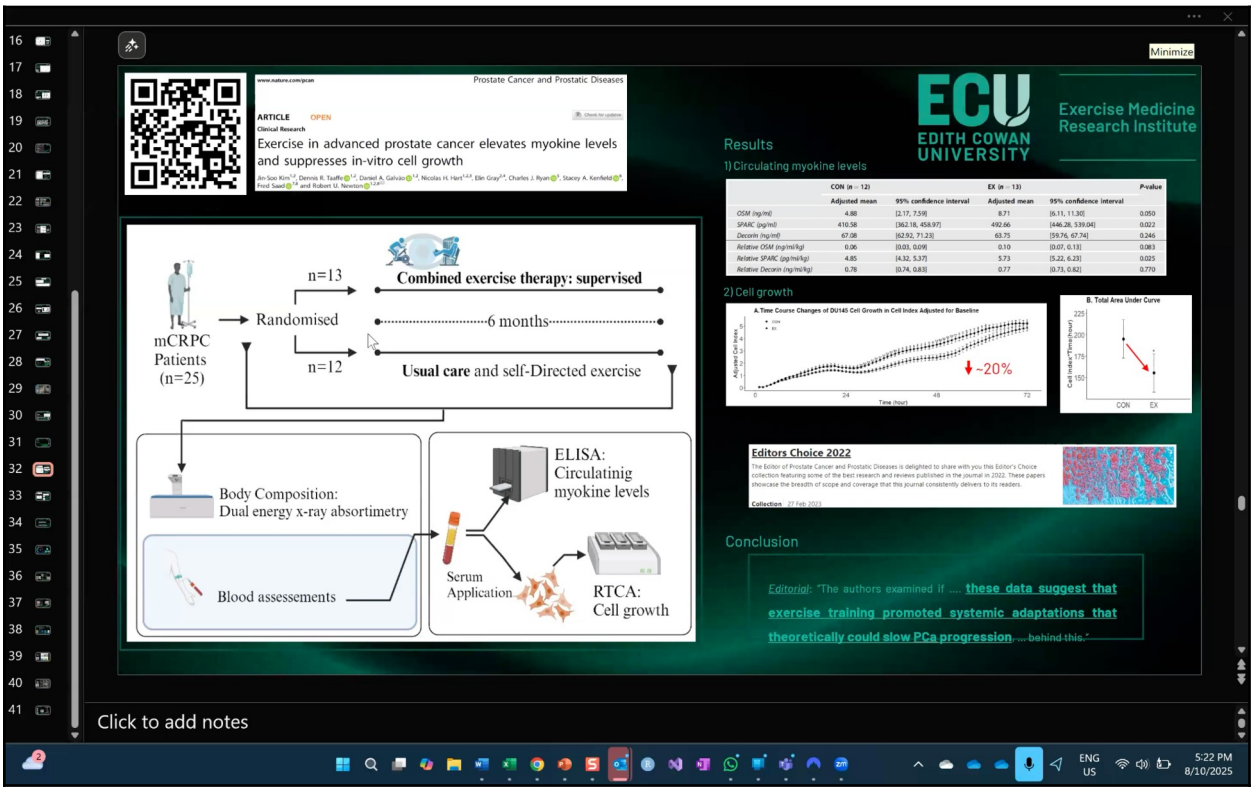
heavy, and the fear was that they would fracture. Now that approach was not highly successful. Patients tended to be sedentary and they just declined faster. And the medical oncologists and others said to us, look, this is not working. We have to exercise these patients. We would have them do dynamic strength training and aerobic training, but if they had a metastatic lesion in a particular site, for example, the right femur, then we would adjust the exercise prescription to avoid excessive loading of that site. During Covid19, like everyone else, we had to pivot to telehealth. So that was an interesting experience in itself.



Now I can't present at the moment, because we're still doing the analysis the actual survival outcomes from that, but I think probably key in this first paper currently out in review at the moment, but overall, looking at the safety, which is probably the key issue here, is we had 620 adverse events during this trial. Now, 49 of those were related to the exercise, either the testing or the training and all of those were grade three or less. So grade four is an adverse event that requires hospitalization. Grade five is death, is mortality. So if you have a look across this, the adverse events were expected. They were like muscle soreness, some muscle strains, etc. But there was nothing, no adverse events that were seriously related to the exercise.

The first thing to come out of this study is that this was one of the largest studies to show that patients with bone metastases, patients with advanced metastatic disease, can undergo moderate to vigorous exercise, including isometric loading across their bone metastatic sites, and it is actually safe if it's in the right environment, if it's supervised. This harks back to what I'm going to be talking about for most of this session is about the importance of precision exercise medicine, not generic physical activity recommendations.

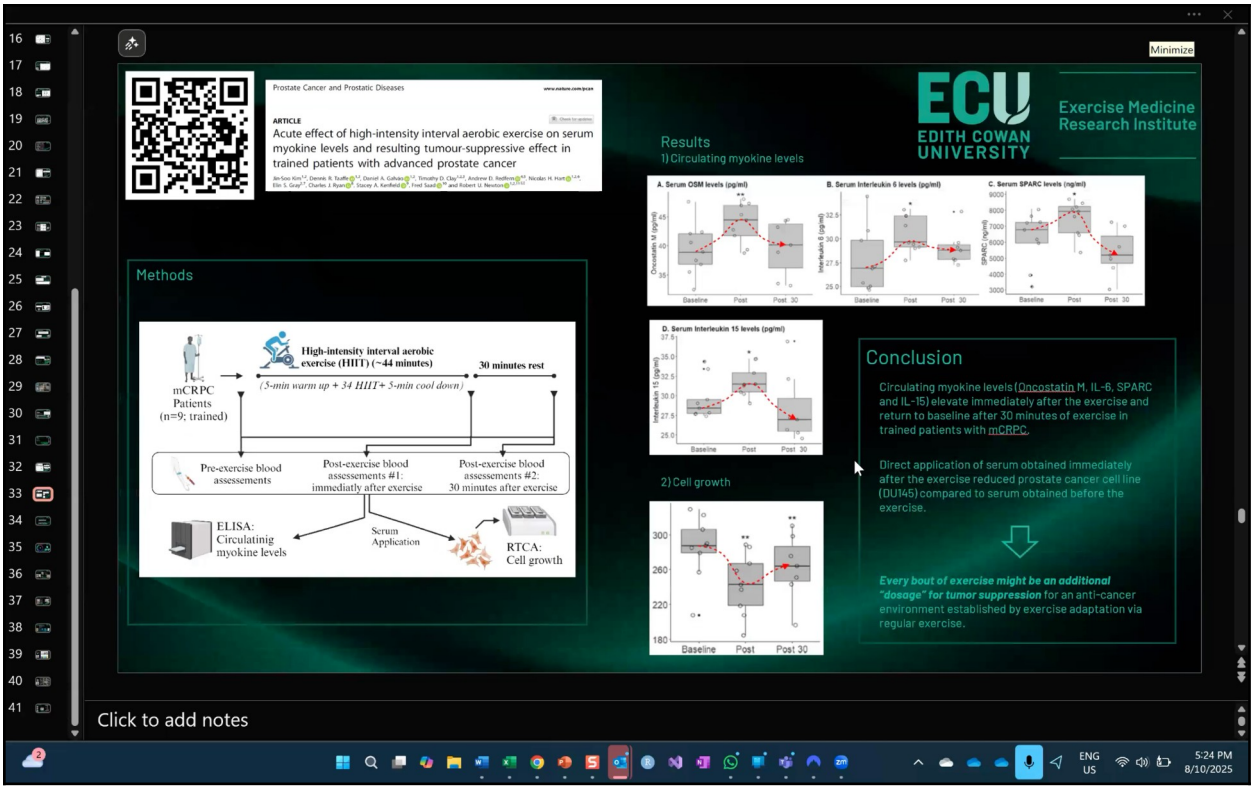
“Personalizing Exercise for Your Cancer Care“ (Rob Newton, PhD, DSc) [#164]



I'll just show you some of our more lab-based work from that particular study. This is a study that we published in the Journal - Prostate Cancer and Prostatic Diseases in 2022. What we saw here is, at the start, these men coming into this trial, we drew blood from them so they were untrained at this point. We then exercised them for six months to this point and drew blood again. In both cases, this was resting blood. Okay, so this is their basal blood. We looked at body composition with dual energy x-ray absorptiometry and also blood assessment, we looked at these circulating myokines. “Myokines” are small peptides. They're cytokines, but when they're released from muscle, they're termed “myokines”.

These myokines signal to every other tissue in the body, every cell. We also applied the serum, so that's the liquid portion of their blood. We applied it to living prostate cancer cells, and we did what is termed real time cellular analysis of growth, and what we found was a considerable increase in certain myokines at 6 months of exercise training. Now these myokines, if we take them out in vitro, in the laboratory, not in the human, and we pour these isolated myokines over living cancer cells, whether it be breast cancer, ovarian cancer cells, or prostate cancer cells, they have a suppressive effect. They slow down the rate of growth, and they also drive cell death. They have individual signaling properties here as well, but when we took the whole serum from these patients, we saw a 20% reduction in growth. So what's happening here is, over six months, we're actually altering the internal chemistry of these men, and even though they've got stage four cancer and they're under a lot of treatment, they still retain the capacity to create a more cancer suppressive environment. And this probably explains why patients who

are physically active, in particular, patients who do targeted exercise medicine, why actual progression of their disease is slower. The paper received the Editor's Choice in 2022.



What happens each time they have a bout of exercise? We took these men that were already well trained, and we took blood at rest, and we exercised them for 34 minutes using a high intensity interval training session on a cycle ergometer, and took blood immediately post and then 30 minutes later, and did our same analysis of myokines and cell growth. And what we see here is a very nice elevation of these myokines, OSM, interleukin 6, SPARC. Levels drop down by 30 minutes post. But that's because these myokines get taken up quite rapidly in the tissues and the cells, and they're out of the blood circulation. But when we looked at applying the serum from these patients to living prostate cancer cells, we saw a very nice suppression of growth. Now what this tells us is that, yes, you need to develop a long period of exercise where you're in a trained state, because when you're in a trained state, you have a more cancer suppressive environment even while you sleep. It also tells us that every time you go and exercise, you produce a further burst of these cancer suppressing myokines. Now keeping in mind that this is serum, so we did not place the patient's immune cells in with the cancer cells. We're doing those experiments now and that's the next stage, but this is just the signaling from these myokines.

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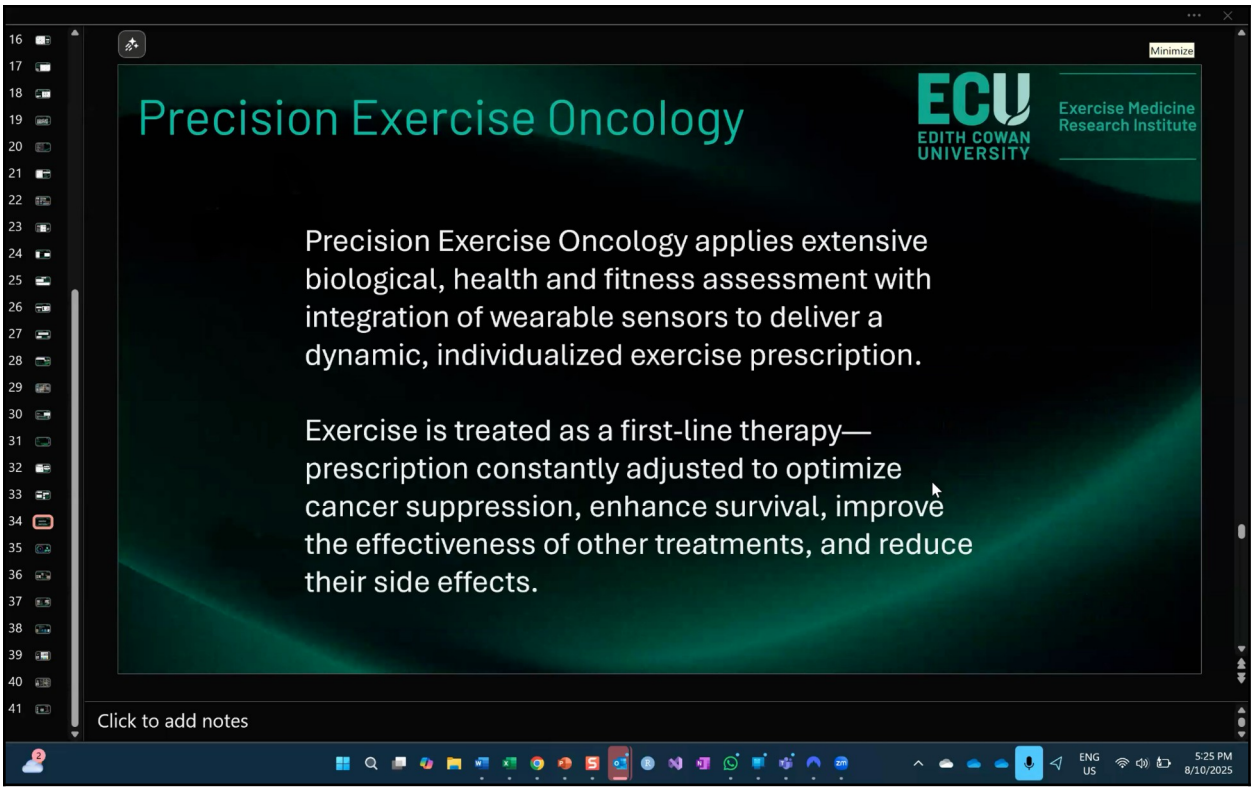


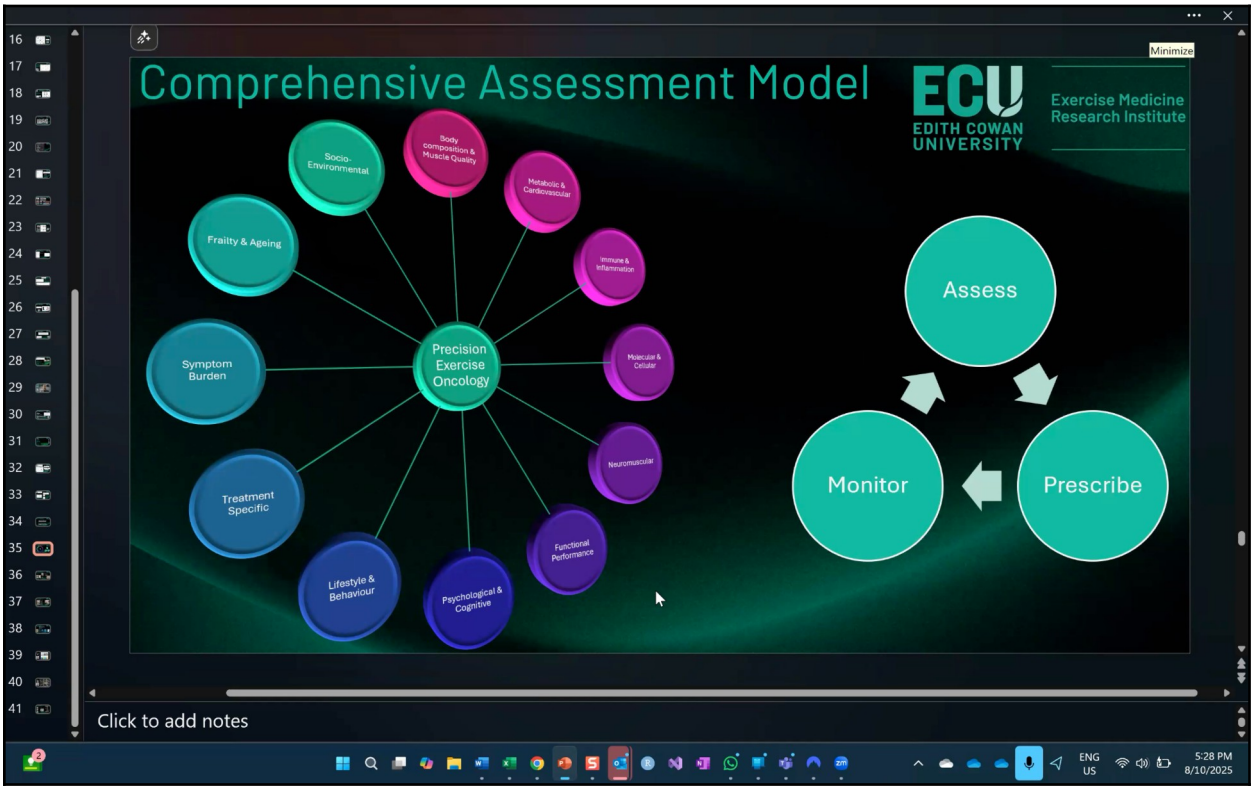
Rob Newton 20:50
This is leading up to where I wanted to spend most of the session talking about, which is precision exercise oncology. We need to move away from generic physical activity guidelines and just generic information that we're giving to patients now. The current recommendation is 75 to 150 minutes of moderate to vigorous aerobic exercise, two or more resistance training sessions per week, and to do some balance training, which is a good recommendation. It works quite well with apparently healthy older adults, but I think that patients deserve more. They deserve a more tailored and more precision exercise oncology approach. Every patient is different. Cancer is 100 different diseases with so many dozens of different treatments, and how that impacts on the patient is vastly different, and we need to actually apply the most effective exercise medicine that we possibly can, the right mode, the right time, at the right dosage. I guess the analogy would be, if you are diagnosed with cancer, and the treating doctor says, “Look, we found the cancer. You've got cancer. What we're going to do is we're not going to do any more tests. We're going to give you some chemo, some radiation therapy. We're going to do a bit of surgery at some stage, and we're also going to throw in some immunotherapy as well.” In the hope that something works.

As a patient, you'd be extremely disappointed with that, and you'd push back and likely go to a different doctor. But that's the current way in which, in some ways, we're managing exercise as a general recommendation, throwing everything at the patient. We're throwing resistance training, and we're throwing aerobic training at both moderate and high intensity, etc. We're not looking at the timing of it, how it fits in with their treatment that they're receiving, etc.

“Personalizing Exercise for Your Cancer Care“ (Rob Newton, PhD, DSc) [#164]

In precision exercise oncology, we're looking at extensive biological health and fitness assessment and integration of wearable sensors as well. We're working on this because it's such a valuable tool. And do some very individualized exercise prescriptions which are highly dynamic, constantly adapting to the patient and how they change, but also the treatments they're receiving. The disease is changing as well.

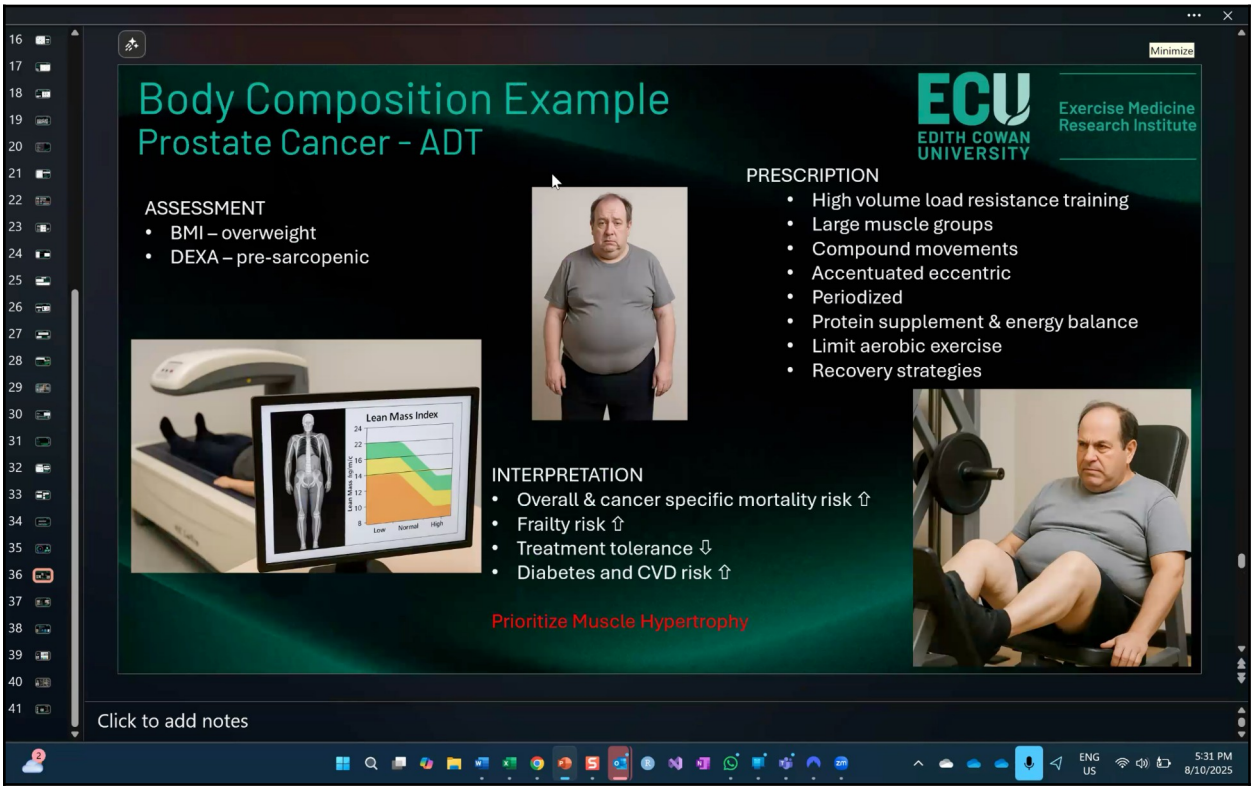
Exercise medicine should be treated as a first line therapy because it is so effective, and effective not just in better quality of life and physical function, but also in the way in which it enhances the effectiveness of other treatments and reduces their side effects. We need to constantly adjust this exercise to enhance as much as possible the cancer suppression that it drives, enhance survival, improve the effectiveness of the other treatments and reduce their side effects.



This involves quite a comprehensive assessment of body composition and muscle quality, metabolic and cardiovascular factors, and immune capacity. We need a full blood count, and we need to understand the health of those immune cells as well and get a handle on inflammation. If the patient, which most of the patients who are diagnosed with cancer, because in the main, they will be sedentary. In the main, they will have an unhealthy body composition. They will have a low level systemic inflammation, and this makes it very difficult for their body to fight the cancer, different molecular and cellular factors as well, which are influencing their internal medicine, their internal capacity to hold back the cancer and also to optimize the exogenous treatments, chemotherapy, radiation therapy they receive, components of neuromuscular capacity, functional performance, psychological and cognitive.

If the patient is in a bad space in terms of their mental health, they will not respond well to exercise medicine, this will be blunted, and they certainly will not do as well in terms of the treatments that they receive. They need a thorough assessment from a clinical psychologist, determining those patients at risk or who have depression, high levels of anxiety around their disease, fear of dying, etc., and getting some help to get around that or reduce that lifestyle behavior factors, treatment-specific factors, as well changing the exercise prescription around the future treatments that they're receiving, the current treatments they receive. I'll give some examples in a minute of the symptom burden they're experiencing. For example, fatigue is very common but can be treated quite well with different types of intervention, including dietary and also exercise medicine, as well as some psychological intervention as well. Then there are aspects of frailty and aging, and of course, the socio-environmental aspects around the patient.

So after this extensive assessment, then prescribing a highly tailored precision exercise intervention, but also has to include very, very careful precision around their nutritional therapy and also their psychological support as well, ongoing monitoring as well to adapt and continually alter what's being prescribed, reassessing, going through this cycle of assessment, prescription, monitoring, and reassessment.



Let's go have a look through a couple of examples. We routinely run DEXA scans on our patients. It's the gold standard for determining body composition. It does give us also, of course, bone density, which is absolutely critical for many, many patients going through cancer, because the cancer and many of the treatments are quite hard on the skeleton. But also to look

at muscle and fat content, we know that survival outcomes will be much poorer for patients who have sarcopenic obesity. This means low muscle mass, high fat mass.

This particular patient has been determined to be pre-sarcopenic. Clearly, they have a considerable amount of visceral fat, which is problematic, but that's not the main problem we need to target. Because of their low muscle mass, their overall and cancer-specific mortality risk is very high because of the protective effect that muscle tissue has. Their frailty risk is high. They'll have poor treatment tolerance. We know that patients with low muscle mass do not tolerate systemic treatments very well for a whole range of reasons I'm happy to talk about later. We have to prioritize muscle hypertrophy. That is the priority. We have to turn this around because this is the limiting factor. This is causing the greatest illness and risk for them.

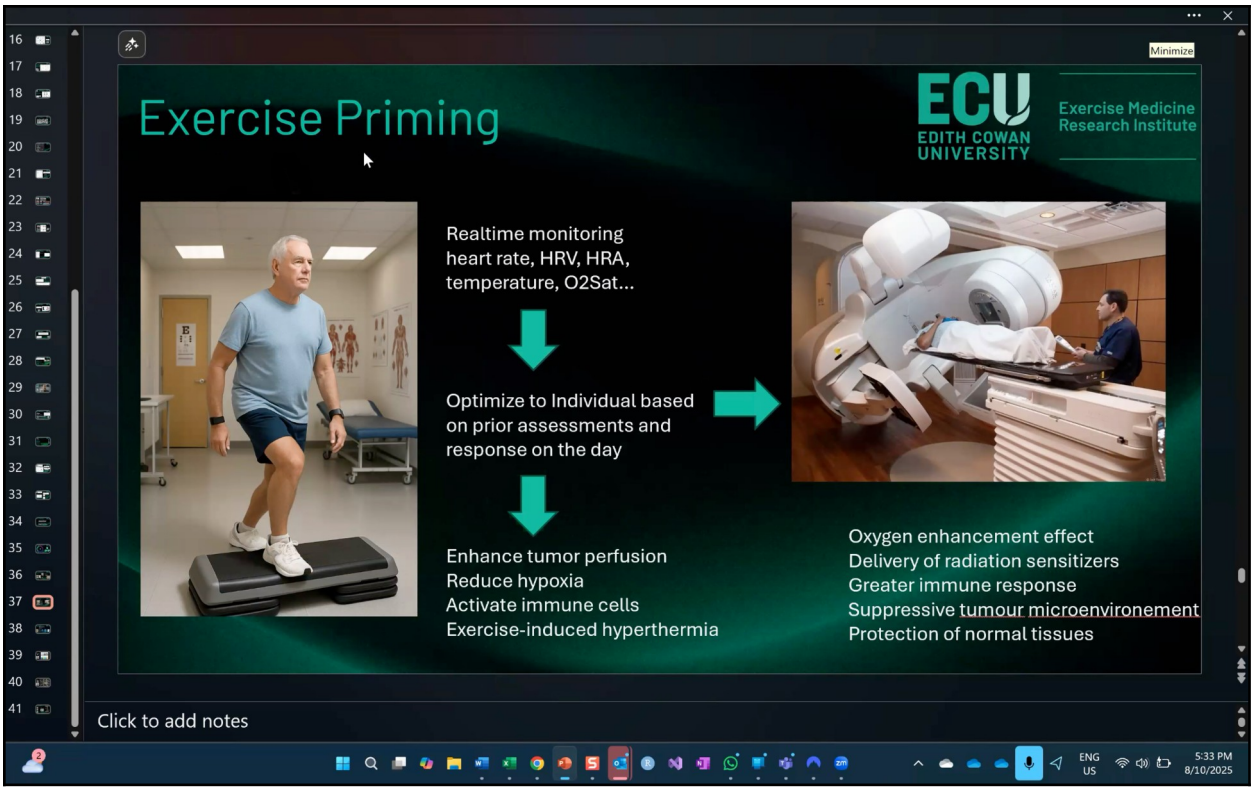
What is the prescription? High volume load resistance training, large muscle groups and compound movements, including accentuated eccentric, highly specialized exercises where we place more emphasis on the lowering phase. There's a whole lot of ways that we can do that.

Why is this important? Because a man on ADT does not have testosterone as an anabolic agent within his body. We know that “eccentric exercise” (a type of strength training where the muscle lengthens under tension, such as the lowering phase of a squat or a bicep curl; often called "negative reps" and focuses on controlling the movement as the muscle extends, which can lead to increased strength, muscle size, and injury prevention) uses a different “anabolic pathway” (metabolic processes that use energy to build large molecules from smaller ones). This is how nuanced the exercise prescription is becoming. It needs to be periodized. We've talked about that implementation. Maintain energy balance, not an energy deficit.

Our priority at this point is not to lose fat. The priority is to build muscle. If we have an energy deficit, then he will not lay down muscle as quickly so we will limit aerobic exercise. Any aerobic exercise, particularly in a man who is castrated, will have a limited capacity to grow muscle, and it will interfere if he does any aerobic exercise. So we limit that, and we also look a lot at recovery strategies.

Rob Newton 28:58
For most of us it doesn't matter, but for a man who has no testosterone circulating in their body, aerobic exercise interferes with the development of muscle mass.

“Personalizing Exercise for Your Cancer Care“ (Rob Newton, PhD, DSc) [#164]



This is another example. This is what we're doing extensively in a range of cancer centers around the world. We call this “exercise priming”. The image of the patient is AI-generated, so it's not a real person. We use wearables extensively on the patient here, and then we're looking at real time monitoring. We have them doing an exercise bout immediately before they go into the linear accelerator to receive their radiation fraction. The purpose here is using real time monitoring of heart rate, heart rate variability, heart rate acceleration, temperature, oxygen saturation, and a few other parameters that we look at. We optimize it for the individual. This is based on their prior assessments. We've gone through an extensive assessment portfolio, and also their response on the individual day, because patients vary markedly on how they present each time to radiation therapy. The purpose of this is to enhance tumor perfusion (the process of circulating blood or fluid through the circulatory or lymphatic system to an organ or tissue, ensuring delivery of oxygen and nutrients and removal of waste). This reduces hypoxia (an inadequate supply of oxygen to the body's tissues), activates immune cells, and it produces an exercise-induced hypothermia, so it raises the body temperature. The purpose of that is to have a better oxygen enhancement effect, better delivery of any radiation sensitizer.

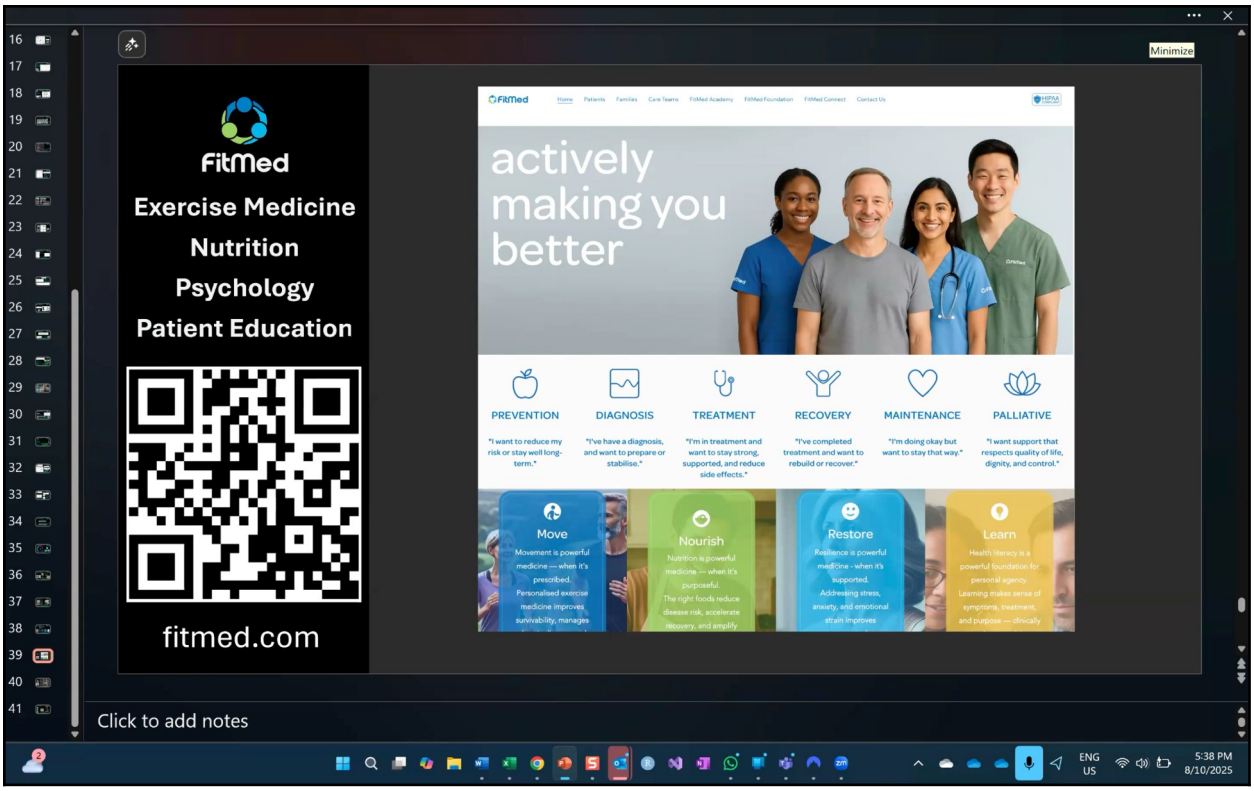
Solid tumors, in the main, have poor blood circulation. They're hypoxic. It's very hard to get exogenous substances into them. It's very hard to get immune cells into them. The exercise boosts blood pressure and this boosts perfusion through the solid tumor. We get a greater immune response, as I said, a more suppressive tumor micro environment. We also get protection of the normal tissues as well, so we get less side effects.

“Personalizing Exercise for Your Cancer Care“ (Rob Newton, PhD, DSc) [#164]

The final example is where we're using ubiquitous monitoring of patients, using the wearables into an app where all of the information from the wearable then is passed up to the cloud, undergoing AI analysis. What we're looking at here is very, very subtle alterations in physical activity characteristics, subtle changes in sleep quality as well, and a whole range of other parameters, body temperature, oxygen saturation, a range of measures that we look at to detect very subtle changes. These subtle changes may indicate disease progression or that treatment toxicity is accumulating, or the patient is starting to experience some mental health issues. But of course, a patient has quite a noisy signal, because they have good days, they have bad days, they're up, they're down, everything. So it's difficult without the use of AI and machine learning to pick out signals within all that noise, but it can be done. What that does is allow us to raise a red flag, and then we can intervene, do more blood tests or radiology to see what is going on and then adjust treatment strategy..

This is a very important use of precision exercise oncology because it overcomes the problems of the very episodic way in which we interact with the patient. In some cases, the medical oncologist may only see the patient every month, or it might be every three months. Quite often the physical therapist or the exercise physiologist sees them a lot more frequently. They might see them once a week. Quite often they will pick up changes that are occurring. But with the modern technology we have now, this is real time, 24/7, and that's very, very important moving into the future, to be able to pick up these early warnings. It's the canary in the coal mine.

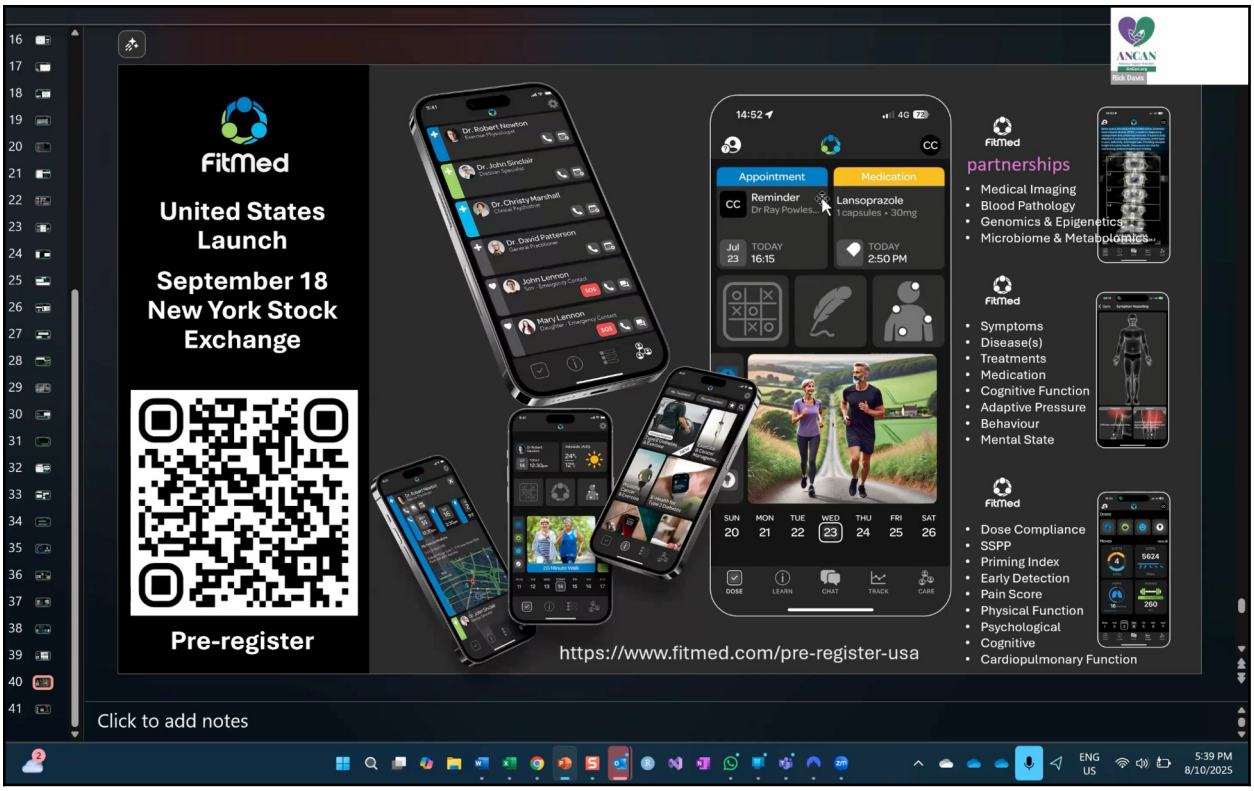
“Personalizing Exercise for Your Cancer Care“ (Rob Newton, PhD, DSc) [#164]



We have built this out into an ecosystem and these are different approaches to the way we can provide more precision in our exercise oncology.

I have been working with FitMed to introduce more integrative oncology that encompasses exercise medicine, nutrition therapy, and psychology. But also a very important aspect, which is often overlooked is patient education, that the patient understands what they have, what is happening, and why it's being done. It's very hard to ask a patient to get in the exercise clinic and lift really heavy things. They're going to ask, “Why am I doing this?” But if you can explain to them the underlying mechanisms that we will try to hold muscle on you, because muscle is a very powerful organ to send signals to suppress your cancer, we change. We are changing the narrative here, because we need to move away from talking about exercise and nutrition and psychology. We need to move more towards talking about what we're trying to actually change in the internal medicine of the body. The exercise is just the syringe. The nutrition is just the tablet. It's not the actual changes in the underlying anti-suppressive mechanisms or the enhancement of the chemotherapy we're trying to produce. We're very much changing that narrative. We're doing this because we're trying to increase blood flow through your tumor so we can get the radiation therapies more effective.

“Personalizing Exercise for Your Cancer Care“ (Rob Newton, PhD, DSc) [#164]



Rick Davis 34:34
To many of us, you're preaching to the converted. Back in the day I worked with June Chan, who I see you work with, and it was even before Stacey Kenfield got there. I was responsible for setting up the program at UCSF that you may be aware of, the cancer exercise program that they have there. In June 2012 she published a paper. I put the link in the chat. She identified around 100 genes that are responsive to exercise.

A lot of the technical stuff you're talking about, obviously, is very important. But where this all falls down is in application, which is why, starting in 2008 or 2009 we wanted to create a clinically based exercise program to help guide patients as to what exercise to do. The problem we have as I see it, and I love to hear what your thoughts are on application is who's going to do all these calculations and figure out what the patient's going to do.

This is not the problem we've had in the United States. It is that exercise has never been covered by insurance. Yeah, and, and that was the problem back in 2008 and 2009 when we started this program. And eventually we found a grant and we started the program. It was so popular that UCSF adopted it into their general public, and the cancer exercise program still goes on today, but it's basically only a consult. So who's going to run all these numbers? Who's going to who you're going? They look at you like you're crazy.

Rob Newton 36:49
I feel your pain. I know. I've been working in exercise science, exercise physiology, for 45 years, I’m telling my age now. I've been working in exercise oncology for the past 22. I feel your pain.

We have a very large clinic based in Perth. We see about 35,000 patient contacts a year. We are not even scratching the surface. We will be seeing less than 5% of the patients in Western Australia, just our state, and we have to come up with ways to scale it up. That's why I reached out to a colleague who is a specialist in digital technologies. And that's why we put FitMed together. And the purpose is that we have to come up with ways in which we can scale up so that every patient can access high quality, precision exercise oncology as well. I've worked closely with June and Stacey. We've run trials there. We couldn't recruit because in San Francisco, it's too difficult to get to the site. It's too expensive. You can't get parking. All the things that we all experience. We have to bring those barriers down. The only way to do it is through digital solutions. It has to be through virtual delivery into the patient's home.

My goal at the end of my career, which I'm approaching, is that the patient will receive care at a place and time of their choosing. Not have to come in to see me at the university clinic on a Wednesday at four o'clock, and chances are I'll be running late. So we need to change that, and the only way to do it is through digital solutions. You asked a very good question, because that's a major problem that I had six years ago, which is: How do you manage all this data? We have radiological reports. We have blood pathology. We have all of the patient-reported outcome measures, many of them done on paper back then. They're not done on paper anymore. I'm pleased to say that all that has come to an end. It is an enormous workload, and my team was spending more time pushing paper around and trying to work through data than they were actually sitting in front of the patient, helping them. That's all changed. We have AI now, and in our model, it all goes up into the cloud. The AI runs across it. It gives extensive analysis. It comes back to the clinician, and the clinician has to read it and make any adjustments, because it will make mistakes. The AI makes mistakes, but it does all the heavy lifting for us now. We have a way forward by which we can provide high quality, precision exercise oncology to the patient, whether they're in the clinic or whether they're at home. And that's that's where the future is, in my opinion,

Jeff Marchi 39:57
I'm 78. I've been CRPC for six years, metastatic for four. I'm six foot four and 188 pounds. I've had surgery, radiation 15 years ago, surgery. I go to the gym three times a week because I had my knee replaced two years ago and realized I couldn't get off the floor. I go to the track. We have a track across the street. I go there every day, twice a day. Run a mile, 15 minutes each time. When I go to the gym, three times a week, I work on my arm muscles, on my leg muscles. I do a lot of sit ups. I'm wondering about your talk about the exercises you specifically talked about. You needed an assistant to help you have higher weights going up and down. I can now get off the floor. My muscles have improved. But am I running too much? Is aerobics a problem? Where does what I'm doing fit with what you recommend?

Rob Newton 41:08
Every patient is individual. We need to look at what you're doing, which is fantastic, absolutely fantastic, because a large proportion of people with cancer are sedentary, and because of that they're really compromising the capacity of their body to tolerate treatment and also to overcome their disease. So what you're doing is fantastic. However, in particular, you're doing

pretty well for patients that are really struggling. You can imagine, if they're undergoing immunotherapy, for example, then we have to be much more nuanced in what we do, and that means that, an extensive assessment, as I outlined, to understand their internal chemistry.

A good example is the gut microbiome. We have to look at the gut microbiome. If their gut microbiome is out of sync, then this is creating an environment, for example, where they're not as responsive to chemotherapy. So we have to look at that and how we fix that. Targeted exercise helps with the gut microbiome, but it's mainly nutritional intervention. In some cases, it may actually involve a fecal transplant, but that's just one example. It comes down to what the physiological levers are, the mechanisms that we have to pull to get the patient into a more cancer suppressive environment, and one in which they can tolerate treatment better.

Roger Royse 42:29
Related to that, Rob, what about over-exercising? We had another speaker here a month or two ago who cautioned against doing too much for people in treatment. I heard that, in fact, the doctors, it felt to me like they were doing everything good to talk me out of exercising. It's like, “Oh, don't overdo it.” And just intuitively, it seems like that would be awfully difficult for most people to do. What do you think?

Rob Newton 42:53
I've literally seen thousands of people going on a cancer journey. It is exceptionally rare to find an individual who exercises too much. I've had some patients who have been Ultra athletes, ultra triathlon, ultra marathon, and they have tended to do much too much. I have had athletes that are aerobic athletes, and they run too much, and they won't do resistance training. That's a problem, absolutely. And again, that's why we do extensive assessments. We do measures such as immunoglobulin A. We do assessments that we traditionally do to determine over training, to see if the immune system is suppressed, but definitely if you do an extensive amount of exercise, it can compromise your body's ability to repair and to fight the cancer. But that's exceptionally rare, very, very rare, and it does require a very large amount of exercise to get into that state. Even for someone with cancer, our problem is that most, two in three, cancer patients are sedentary. That's our hurdle we have to overcome.

Ken Martin 44:02
I'm currently at a standards conference in Montreal, Canada, so I'm going to show you this on my video as well, if that shows me, I'm not sure. Anyway, I'd really like to talk to you about the app, because one of the problems a lot of researchers don't understand is that you really need to get standardized data. It has been mind bogglingly difficult trying to get anybody in exercise oncology, not to mention cardiology, interested in standardizing measures. You need to get them standardized so they can integrate with electronic health records around the world. That's really important. I'd really love to talk with you about that sometime.

Rob Newton 44:44
I'm in London at the moment, and I had a very good meeting yesterday with a person from Google. There are some very exciting things coming down the pike around that. I think we'll

move ahead more in the next five years than we have in the last 20. Things are really starting to accelerate, and I think we're going to see some really good change. We're going to see really good processes being rolled out in hospitals. It comes back to the previous question: who's going to pay for it all? We have a problem in that the medical system is quite happy to pay $300,000 for immunotherapy, but won't pay $4,000 for a proper integrative oncology program for the patient. So that's an issue. And you know, how do we actually get that funded? That's something we've got to overcome. Now we're working hard towards that by exactly what you're saying, getting the data, showing and demonstrating the benefit, and how much it does actually save the government.

Ken Martin 45:49
I understand that, but I read study after study after study that says at the end of it, they say we need to standardize our measures and protocols. And there's a there's an extension to that that moves into the Health Information Technology standardization, and that's what this, the conference I'm at is all about, and I've done this for 10 years, and I'm trying to get exercise science into this space, and I've only met one person out of probably about 100 who even understood what I was talking about.

Rob Newton 46:20
On the positive side, we've now standardized dosage, and it wasn't reported properly in the past. You'd never run a drug trial and not know what the participants took.

Ken Martin 46:31
That’s what I'm talking about. Standardization goes beyond just getting those protocols. It's just an example. It's an electronic standardization so that it can integrate with electronic medical records.

Rob Newton 46:42
Sorry. I misunderstood the question.

Gary Peters 46:53
What do you do if you're not in one of these special programs, and you just have physical problems that keep you from doing some of these standard exercises, or you hurt yourself? When I first started to exercise post surgery, I was doing a very mild exercise, and I fractured a vertebrae in my back, which set me back a long time. How do you prevent that if you're not in one of these supervised programs?

Rob Newton 47:50
There are many aspects to this. We're working really hard to upskill the workforce. Physical Therapists, in the main, are not trained in working with people with cancer. Clinical exercise physiologists are the primary allied health professional that would work with cancer, because cancer is a systemic disease, and so clinical exercise physiologists are mainly the allied health professional that is most qualified to work with people with cancer in terms of exercise assessment and prescription. We don't have enough exercise physiologists. We don't have

enough physical therapists. We're working really hard to upskill and that involves a lot of training. We have to train the workforce so there are more people available. We have an enormous gap in capacity, both in facilities, but also in personnel.

In Australia, we are working very hard to upskill our nurses. We have specialist nurses that work in cancer. For example, we have prostate cancer specialist nurses, and we will upskill those nurses so that they have the basics of being able to recommend exercise to their patients and give them a referral pathway, so they can get assistance for patients in particular who are not doing well. They can be supported remotely and by an exercise physiologist, and then they can go back to their local fitness center or their park or even at home. But for many, many patients, there are too many risks that can occur, and they need a higher level of supervision.

We can overcome these difficulties through the digital technologies that have arisen out of Covid 19 restrictions. Covid 19 was certainly a nuisance, but some great things came out of it. We really enhanced the internet capability around the world. We enhanced the video call capability, the exchange of digital data, and everything else. We will see a future where people will have access to high levels of exercise medicine, diet therapy, and psychological support, and they will be able to access that online and be able to do it in their home. We've just got to figure out how the heck we pay for it. That's the problem, because these things are expensive.

Gary Peters 50:07
Will that take into account a personalized approach?

Rob Newton 50:24
Absolutely. We're doing testing remotely. We're supporting patients all over the world, in Singapore, France, Canada, UK, all over the place. We get assessments done. We get blood test results. We can get DEXA scans done pretty much anywhere. Now, we get the radiology reports coming in. Around bone mets for example, it's very unfortunate that you had a vertebral fracture, but we get that information, and then we use that and can design a highly tailored, highly precision exercise program. Not just exercise, sorry, it is integrative oncology. So it's right across the board, and that will only enhance our capabilities as we are able to better leverage artificial intelligence.

Russ Hollyer 51:35
I was wondering about radiation therapy: SBRT, IMRT, etc. Is the exercise more beneficial before or after? Or does it matter? And what type of exercise is most beneficial, like cardio HIIT (high intensity interval training), heavy duty resistance training?

Rob Newton 51:57
It should be done before the radiation. We need a high blood flow through the solid tumor when it's irradiated, so you have to do it beforehand. As to the type of exercise, it's likely to be a higher intensity aerobic exercise. The goal is to lift the cardiac output and the metabolism of the body into a nice optimal band. We've got algorithms to determine that, and then we try and hold the patient in that band, and then get them there right up until they say, Mr. Royse or Mr. Peters,

we're ready for you now. And then they go straight into the linear accelerator for their radiation fraction.

Russ Hollyer 52:37
Are you familiar with blood flow restriction training or blood flow occlusion? Because those get you metabolic stress, and they really pump you up, pump the blood, so to speak, have those been studied for radiation therapy?

Rob Newton 52:53
Not for radiation therapy. The mechanism would not be there. With solid tumors, they don't have the same arterial constriction that occurs in most other tissues when we exercise. When we even think about exercise, we start to shut down blood to our non-essential organs, like the liver and the intestine. We don't need to digest food when we're running away from a tiger or something, but interestingly, in tumors that response doesn't occur. So as long as you've got your heart rate up and your blood pressure up, then you will have better perfusion through the tumor. And so it's more likely to be cardio exercise, aerobic exercise, rather than blood flow, occlusion or even resistance training, for that matter, that has that effect.

There are groups using blood flow restriction to enhance the “hypertrophic response” (the increase in the size of a muscle's cells, leading to a larger muscle). In patients where it's very difficult to lay muscle down, they will use blood flow restriction. We use eccentric exercises. We do a lot around nutritional support as well. The bottom line is probably 90% of muscle growth just comes down to how much weight you lift – it's the volume load. The more kilograms or tons that you lift in a session, the greater the drive to the muscle to grow.

Russ Hollyer 54:08
The BFR (blood flow restriction), would that be good for the gentleman who's talking about having some spine issues and whatnot, and the stresses that that's placed by standard resistance training on people?

Rob Newton 54:29
It could well do. The problem with blood flow restriction training is that you don't get much of a functional transfer. There's no neural learning or neural component to it. I guess you're building a bit more muscle. But how effective is it? We'd be looking more to improve his physical function, his functional capacity. It's obviously going to improve quality of life if he can do tasks of daily living more easily. The other thing is, it's hard to access. I mean, a gentleman is having trouble accessing a suitably quality person to help him with his exercise, let alone being able to introduce blood flow restriction.

Russ Hollyer 55:10
Would you feel in general, the “Big 5” exercises (squat, deadlift, bench press, overhead press, pull-up) are the most important ones? They have to be modified appropriately for people within their situation.

Rob Newton 55:23
For someone who doesn't have bone mets and doesn't have any serious musculoskeletal issues, orthopedic issues, we really try to move our patients towards those big functional exercises. So squat, deadlift, push up, or bench press, bent over row, etc. We do try to move them towards those exercises. Many patients will never get there. A lot of our patients are in their 80s or even their 90s, and we then generally rely on the resistance training equipment, the pin loaded equipment. Leg press, chest press, in a seated position, etc. We try to progress them towards more functional movements, but some will not get there.

Roger Royse 56:10
There's a question in the chat: is there any research on the effect of exercise on radiation-related side effects?

Rob Newton 56:22
We published a paper recently, and we showed that both aerobic exercise and resistance exercise had a very nice effect on ameliorating or reducing the fatigue effects of radiation therapy. And so the evidence is that the exercise will reduce that particular side effect from radiation therapy. If we become more nuanced and precise, then we will also reduce the, well, they're not really toxicities, but we'll reduce the damage to healthy tissues that radiation therapy causes, and so we'll have even less of that fatigue-related effect that's occurring as well.

Roger Royse 57:09
What are the medical devices recommended for measuring fitness and health?

Rob Newton 57:23
Probably our gold standard is that we do use DEXA extensively, because we need to know how much muscle and fat the patient has and how that's distributed. Testosterone suppression therapy, for example, is devastating on the muscular system. They lose a lot of muscle from their arms and legs, and that's highly problematic not just for frailty and physical function, but also reduces their internal pharmacy.

Your muscle system is an internal pharmacy. It is generating hundreds of different compounds and chemicals which have strong cancer-suppressive effects, or they signal to our other systems, like our immune system, to be more immuno-surveillant. They also signal to our fat tissues to help reduce that chronic inflammation and also metabolic syndrome, the factors around it. We have to build our muscle, and DEXA is used extensively to screen and monitor.

Beyond that, we look at measures of bone density in many cancers, in particular treatments. A good example would be breast cancer. Many of the estrogen-suppression therapies that are used with breast cancer, whilst very effective for controlling the disease, are devastating on the skeleton, and you have a patient that quickly moves towards being osteoporotic. If they fall and fracture a hip, and they're over 65, it's not a good prognosis. So we use the DEXA scan again because that's the gold standard for bone density.

Beyond that, we do rely a lot on, once again, patient-reported outcome measures, and our psychologists use these extensively. What are the concerns facing the patient? How anxious are they? Do they have a level of depression that we need to address, as an example? Then we work with them on how to improve them, or help them, to help them to get through that.

But to be honest, in terms of measurement of fitness, we will do some measures of strength, perhaps, but not always.

We need to stop talking about fitness. We need to talk more about the internal mechanisms of the levers that we are adjusting and turning to produce a more cancer-suppressive environment, or to enhance the effectiveness of a treatment, or to reduce the side effects. More so than just, “Are they fitter?” Having higher cardio respiratory fitness is nice, and it is related to survival, but I'm not sure that's the actual medicine. The cardio respiratory fitness is a byproduct you're changing. For example, the mitochondria. When you do cardio exercise, you increase the number and the efficiency of the mitochondria in the body. What does that do? It creates a healthier state in terms of oxidation. What happens quite a lot is in many of the treatments, in particular chemotherapy, they're very damaging on the muscle and on the mitochondria, and that means that people are in an oxidative stress situation that has all sorts of impacts even in terms of creating cognitive decline in the brain, because these highly active oxygen species are crossing the brain barrier and they're interfering with cognition. Yes, increasing cardio fitness is really, really important, but not in and of itself. It's great if people want to train and run the Boston Marathon. Fantastic. All good to you. But we need to come back to what is the actual underlying physiology that we're actually manipulating to help the patient survive. And that might come back to we're trying to manipulate the mitochondria in the muscle,

Roger Royse 1:00:57
I put a link to the study that you cited in the chat.

“Personalizing Exercise for Your Cancer Care“ (Rob Newton, PhD, DSc) [#164]

CHAT CONVERSATION

00:26:39 Russ: RT:
Any type of RT? SBRT, IMRT, etc?
You mentioned targeted exercise
When: e.g., an hour or so before RT? Or post RT?
What: e.g., half an hour of cardio or half an hour of heavy resistance training?
Any studies supporting it?
Would you expect RLT to see the same advantages?
00:28:58 Russ: Muscle mass correlation or causation with the immune system. Studies?
00:29:19 Rick Davis: Where does the 33 months OS come from???
00:38:01 kenmartin: Have you done preliminary imaging for tumor blood flow immediately after exercise for the ERADICATE trial? If so, do you have images or data of blood flow increases - what did it show? Thank you!
00:42:33 kenmartin: Why did you choose 70% age adjusted heart rate for exercise intensity for ERADICATE intensity when McCullough found ~200% increase with easy exercise in her rat study? Thank you!
00:48:03 Gary Peters: Can you please put the name of your study and the citation in the chat?
00:49:13 ds: Has there been any research on the effect of exercise on prostate cancer radiation-related side effects, particularly urinary side effects?
00:51:05 Roger Royse: https://pmc.ncbi.nlm.nih.gov/articles/PMC5961562/
00:52:08 Helen: I’m grateful to Rob because during my chemo early in 2024, I saw an Australian news broadcasting service featuring his collaborative work where patients were receiving work out sessions before or after their treatment at an oncology center. It motivated me to work out after my own long chemo sessions and empowered me to pay close attention to moving, doing yoga and cardio. I am happy to be in touch with Rob about FitMed options because it seems targeted workout, nutrition and therapy play a vital role for cancer survivors. I also look forward to getting his recently published book.
00:52:32 Vita Riera: Reacted to "I’m grateful to Rob ..." with ❤️
00:52:39 Wee Kian: Reacted to "I’m grateful to Rob ..." with ❤️
00:54:31 Jeff Marchi: I have question about sufficient exercise techniques
00:57:21 Claire: Hi Rob and all, It's Claire here and I am currently participating in Precision Exercise Oncology with you. It is really great to get more information here and better understand how I am benefitting. I feel great, by the way, and so quickly!
00:58:21 Claire: Reacted to "I’m grateful to Rob ..." with ❤️
00:59:42 Kajal Gokal: Reacted to "I’m grateful to R..." with ❤️
01:00:49 Helen: Reacted to "Hi Rob and all, It's..." with ❤️
01:04:13 Russ: Big 5-6 exercises? Are they most important (modified as needed for abilities)?
01:04:42 Russ: Squats, deadlifts, bench press, lat row or pullup, military press.
01:05:45 Brad Power: What are the medical devices recommended for measuring fitness and health?

“Personalizing Exercise for Your Cancer Care“ (Rob Newton, PhD, DSc) [#164]

01:08:43 Helen: Hi Rob - can most of us on this call be able to follow your book if we are not in your FitMed program? Or does it depend on our own circumstances? And thank you for your presentation.
01:09:00 kenmartin: https://workoutcancerblog.wordpress.com/2025/06/26/extending-exercise-measures-into-the-health-information-technology-space/ My blog on standards further blog explains my comment. Thank you. I’m on LinkedIn, please contact me. I have funding too.