

Home Exercise-associated Accidents During COVID-19 Isolation. A Case Report

Case Report

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Abstract— Home Exercise-associated Accidents During COVID-19 Isolation. A Case Report

Introduction: Since the emergence of the coronavirus disease (COVID-19) and the implementation of preventive measures for its containment such as the closure of sports facilities, gyms, and parks along with general lockdown, people have been in need of staying active at home. Accidents due to physical activity in quarantine are increasing, especially without adequate knowledge on techniques and correct prescription of exercise. **Case Report:** We present the case of a physically active 30-year-old male who referred having an accident due to the misuse of elastic resistance bands during his home workout. He suffered head trauma and ocular injury with hemovitreous and significant decrease in visual acuity with retinal detachment suspicion. **Discussion:** The importance of adequately executing any exercise and knowing about safety measures is vital, especially in these isolation times where both physical and mental health must be sought, as well as avoiding saturation of emergency rooms with preventable accidents. **Conclusion:** As health providers, we must guide people in a proper way to stay active despite the isolation, as well as provide safety counseling on injury prevention. **Rev Med Clin 2020;4(3):e30092004003**

Keywords—COVID-19, resistance exercise, closed globe injury

Resumen— Accidente Asociado a Ejercicio durante COVID-19

Introducción: Desde el surgimiento de la enfermedad por coronavirus (COVID-19) y la implementación de medidas preventivas para su contención como el cierre de centros deportivos, gimnasios y parques, la población ha tenido que buscar diversas formas de mantenerse activa en casa. Los accidentes provocados por actividad física durante el aislamiento están incrementando, principalmente debido a la falta de conocimiento para el uso de material deportivo en casa o por incorrectas prescripciones de ejercicio. **Caso Clínico:** Paciente masculino de 30 años, físicamente activo, que presentó un accidente por mal uso de bandas de resistencia elástica durante su rutina de ejercicio en casa. Sufrió un traumatismo facial con lesión ocular que provocó hemovítreo con disminución de la agudeza visual con sospecha de desprendimiento de retina. **Discusión:** Es de vital importancia el adecuado conocimiento en la ejecución de cualquier ejercicio, así como conocer las medidas de seguridad que se tienen que cumplir durante las actividades dentro de casa para evitar lesiones prevenibles que pueden saturar los servicios de emergencia en una época ya complicada. **Conclusión:** Como proveedores de salud, debemos guiar a la población de forma correcta para mantenerse físicamente activos y seguros, así como libres de nuevas lesiones a pesar de las condiciones actuales de contingencia sanitaria. **Rev Med Clin 2020;4(3):e30092004003**

Palabras clave—COVID-19, entrenamiento de resistencia, lesión ocular cerrada

INTRODUCCIÓN

The current medical updates get settled around the Covid-19, which has become a worldwide pandemic provoked by the SARS-COV2 virus with more than 6'200,000 confirmed cases and 383,000 deaths as far as June 3rd 2020.¹

It is well known that the social isolation and the lockdown, characterized by a lesser general external stimuli affects considerably almost every aspect of the human physiology.² The psychological stress generated by the fact of being in a closed space ignites a series of endocrine misalignments that negatively alter the immune system, as well as symptoms similar to posttraumatic stress, confusion, and anger disorders.³ Turning on this cascade of psycho emotional patterns derives into a series of modifications on the sleep cycle, as well as in the total sleep time and its quality. It is well known that sleep disorders are the pathway to immune, metabolic and even cardiovascular system pathologies that when gathered all together form a considerable blockage on any person's state of wellness.⁴

A regular exercise habit counteracts the negative effects of the lockdown, making the fact that every single sports facility has been closed during this period a considerable issue. COVID-19 changed people's daily routines, including changes on the procedures of medical attention and even in the way people have been trying to keep themselves physically active.⁵

Though the open air activities used to be cheaper, more accessible, and usually have plenty of variations at the sports practice facilities, currently, and due to the pandemic lockdown situation, home workouts have been the upcoming tool for keeping physical activity available in every person's daily routine. The use of fitness and health gear for home workouts has been increasing its popularity because of the relative low cost, accessibility and "safety" in its use, as well as the fact of being self-adapted for accomplishing the social distance that the current worldwide situation demands.⁶ We are probably witnessing the first steps of a historic change in human social behavior and daily activities development.

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In case of not having access to a wide and proper variety of fitness equipment, such as the ones provided by most gyms, resistance training through body weight exercises, homemade gadgets using water bottles or even grocery bags, aerobic activities via digital platforms, and even homemade exercises have been growing its popularity beneath physically active population.⁷

As healthcare providers, we need to consider what can we recommend to our patients to stay physically active during this time of social distancing and how to maintain and improve fitness regimens that began during the stay-at-home period, in a harmless and injury-free way.⁵ Regarding exercise-related in-home isolation injuries, the following case report highlights a series of events that can show us important prescription details for giving our patients the safest approach to physical activity during quarantine.

CASE REPORT

A 30-year old physically active male was making his home workout, assisted with an online platform, mainly composed by eccentric exercises using tubular resistance bands with hand grips. He used to settle the rubber band to a wall hanger, with which he could work effectively for several days during the quarantine lockdown.

The exercise he was doing was a standing resistance band front row, emphasizing on the eccentric phase as told before, maintaining constant tension on the rubber band during the whole movement cycle. During this exercise, in a common concentric pull, the wall hanger came off the wall as did the rubber band making a direct impact towards the patient's head **Figure 1**

He suffered a direct blunt facial trauma with instant hemorrhage from two different wounds. One of them was located at the upper left forehead, below the hairline with about 3 cm in regular length, and the second one located beneath the left eyebrow with 1.5cm of irregular nonlinear length. At the scene, simple manual compression was applied for containing the hemorrhage while the patient complaint only of blurred vision from the left eye. He was transferred immediately to the emergency care unit at a local hospital. The wounds were managed with simple cleansing and sutures without requiring any further workup **Figure 2**.

An ophthalmologic assessment was developed, which showed blunt left eye trauma with a hyperemic conjunctiva, ipsilateral mydriasis, normal intraocular pressure (IOP), and grade 2 vitreous hemorrhage, due



Figura 1: Elastic rubber band (ERB) used for working out and the detachment site of the wall hanger used as an anchor.

to this fact an ultrasound image of the left eye for excluding a retinal detachment secondary to the trauma is requested. Medical management started with topical ophthalmic prednisolone acetate, gatifloxacin and nepafenac.

The ocular ultrasound showed normal eye ball limits, fixed lens with integrity of the posterior capsule, normal vitreous, retina well located and ecographically normal, papilla and optic nerve found normal. Following this results it was decided to continue with conservative management **Figure 3**.



Figura 2: Caption of both facial wounds (already stitched) made by the head trauma making evident the ecchymosis running down the left upper eyelid.

After 48 hours a reassessment was done, finding the persistence of left eye mydriasis with slow light response, IOP on left eye of 12 mmHg and right eye of 11 mmHg (normal), with no sign of cataract or any other remarkable findings.

Clinical response was evident showing improvement of visual acuity and lesser pain. After 15 days, the patient had an ophthalmologic reassessment showing an improvement in visual acuity, but still having ipsilateral mydriasis, so medical management changed to topical ophthalmic loteprednol 0.5% and Vitamin B complex tablets.

The patient will be reassessed in 15 days after finishing the treatment.

DISCUSSION

The success of an exercise prescription plan relies on different aspects and variables that are of our concern as physical activity experts.⁸ Some of these variables are the muscle action, exercise selection, and load determination when we talk about strength/resistance training. On muscle action we can gamble beneath several pathways when determining the type of muscular contraction we want to involve, for example, isometric or isotonic. The distribution of the type of exercise in single joint, multi joint or whole body / functional exercise

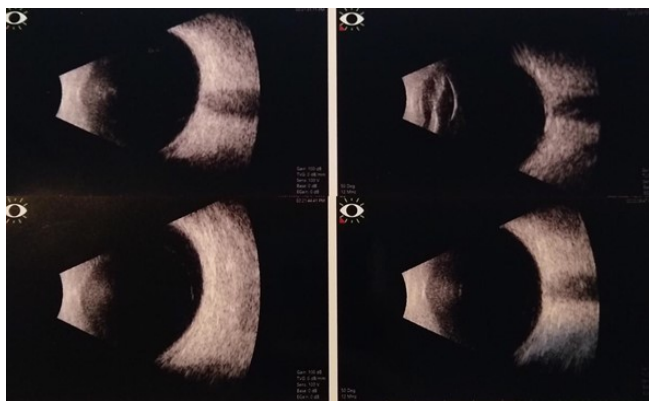


Figure 3: Ecographic images from the left eye showing normal eye ball limits, non-displaced lens, normal vitreous and integrity of the retina as well as the optic nerve.

play a main role on the planning. Regarding the exercise load we need to be aware of the variety of tools we have available, starting with the simple non-resistance or gravity resisted exercise, passing through the body weighted activities, and the use of accessories such as elastic rubber bands, dumbbells, barbells or integrated-weight machines.⁹

Resistance training induces several health benefits and is recommended for the general population. Elastic resistance bands (ERB) could potentially be used as a feasible alternative for resistance training at smaller outpatient clinics and at home as they are versatile, portable, relatively cheap and require little workspace.¹⁰ The muscular activation patterns have been found to differ between elastic bands and conventional resistance training exercises, with higher muscle activity for elastic resisted exercises in different contraction phases. Even though Bergquist *et al* found that in upper body resistance training ERB induced slightly lower muscle activity in the muscles most people aim to activate during flyes and reverse flyes, i.e., pectoralis major and deltoideus posterior, respectively; but, ERB increased the muscle activation level substantially in the deltoideus anterior in flyes, and deltoideus medius and trapezius descendens in reverse flyes, possibly due to elastic bands being a more unstable resistance modality.¹¹

There have been very few studies which made an adequate record of injuries sustained during physical activity, as sustained by Gray and Finch in its 2015 paper where they presented the incidence of injuries at fitness centers during fourteen years. The highlighted cause of injury in their study was the use of resistance / weight training accounting for 55.6%, here they included the use of resistance bands among a wide variety of fitness equipment. Another subgroup in which they

divided the injury incidence was titled as “injuries occurred when using, or due to, a piece of fitness equipment” having 7.3% of all cases reported, but giving no specifications of which kind situations where the injury ethiology.¹² According to a report from the U.S. Consumer Product Safety Commission, in 2009 they recorded 50,000 emergency room visits from home exercise equipment including elastic resistance band hits to face among them.¹³

A case series documented by Rosignoli *et al* presented situations of exercise band-induced ophthalmic trauma involving lens dislocations, having particular characteristics of being in a midterm postsurgical situation which complicated their events but still had not severe or incapacitating sequelae, though the authors emphasize on the mechanism of the antero-posterior recoil which induces an equatorial expansion of the eyeball disrupting the zonular fibers resulting in lens injury.¹⁴ Despite being sparse case reports of ocular injuries due to home exercise with elastic resistance bands, there had been reports of incidence of even a couple of events in two consecutive weeks during the COVID19 isolation, all of them involving blunt trauma with changes in intraocular pressure, retinal integrity, and vitreous hemorrhage. None of them reported with non-reversible damage.¹⁵

Education on proper knowledge about the correct use of any fitness equipment is very important on injury prevention as is the supervision and technical instruction on new exercises, especially in fitness rookies.¹⁶ When exercising with ERB warnings such as damage inspection prior its usage, being careful not to stretch them more than 2.5x its length, watching carefully not to wrap the ERB on sharp or loose edges, as well as reassuring the correct knot or wrapping before exercising should be the start point to a safe fitness approach.¹⁷

Mainly in every kind of exercise prescription, the supervision and feedback on execution is a key part in the results, for example strength gains or injury prevention.¹⁸ For exercise medicine to be up-to-date we need to deliver new options in certain parts of our practice, such as considering physical activity supervision via telehealth, as it has been tested with some chronic conditions with promising prospective results.¹⁹ The convergence point comes up with correct transmission of information for getting upon our target population and objectives, rather being fitness improvement, a chronic disease intervention, rehabilitation exercise or simple sports practice, all targeted from a safety approach with precision and clarity on the prescription.²⁰

We deeply encourage our readers, either health providers, athletes or recreative sportspeople to attend and work closely with a physical activity/sports medicine specialist for assessing the precise program suited for your specific needs. Asking on your corresponding National Sports Medicine Council or Federation is the safest way to pair with a board-certified practitioner close to your location.

CONCLUSIONS

As healthcare professionals, and especially in our position as physical activity ambassadors, we must encourage people to attend and ask for guidance on their exercise prescription. As we know, exercise can't be generalized and this condition does not change at all during the current lockdown scenario. Every individual has its own background and logically their own physical and personal objective to work on with an accurate exercise planning. It is not correct to suggest the same exercise platform app to a diabetic adult who is breaking into physical activity and to an experienced healthy woman who has been running routinely for 7 years. Unfortunately all digital exercise platforms work with algorithms that in a certain way try to individualize the exercise for each one of their users, but these algorithms still do not cover the entire scene that is necessary to make the correct recommendations on composition, loading, frequency and general technique variations depending on the person's limitations.

It is of great importance and responsibility as care providers to get acquainted with the wide variety of platforms currently available, as well as with the endless types of material that we can choose for the exercise prescription, including technical specifications and correct ways of using it. The most important part of our job is to reach people with accurate and safe recommendations, following and fulfilling the principle of *primum non nocere* (First, do no harm).

REFERENCIAS

- [1] World Health Organization. Coronavirus disease (COVID-19) Situation Report-36. 04 June 2020. https://www.who.int/docs/default-source/coronavirus/situation-reports/20200618-covid-19-sitrep-150.pdf?sfvrsn=aa9fe9cf_4
- [2] Weber J, Javelle F, Klein T, et al. Neurophysiological, neuropsychological, and cognitive effects of 30 days of isolation. *Exp Brain Res*. 2019;237(6):1563-1573. <https://doi.org/10.1007/s00221-019-05531-0>
- [3] Jacubowski A, Abeln V, Vogt T, et al. The impact of long-term confinement and exercise on central and peripheral stress markers. *Physiol Behav*. 2015;152(Pt A):106-111. <https://doi.org/10.1016/j.physbeh.2015.09.017>
- [4] Medic, G., Wille, M., Hemels, M. E. (2017). Short- and long-term health consequences of sleep disruption. *Nature and science of sleep*, 9, 151. doi: 10.2147/NSS.S134864
- [5] Nyenhuis, S. M., Greiwe, J., Zeiger, J. S., Nanda, A., Cooke, A. (2020). Exercise and Fitness in the age of social distancing during the COVID-19 Pandemic. *The Journal of Allergy and Clinical Immunology in Practice*. <https://doi.org/10.1016/j.jaip.2020.04.039>
- [6] Jiménez-Pavón, D., Carbonell-Baeza, A., Lavie, C. J. (2020). Physical exercise as therapy to fight against the mental and physical consequences of COVID-19 quarantine: Special focus in older people. *Progress in cardiovascular diseases*. doi: 10.1016/j.pcad.2020.03.009
- [7] Jurak, G., Morrison, S. A., Leskošek, B., Kovač, M., Hadžić, V., Vodičar, J., ... Starc, G. (2020). Physical activity recommendations during the COVID-19 virus outbreak. *Journal of Sport and Health Science*. doi: 10.1016/j.jshs.2020.05.003
- [8] American College of Sports Medicine. *Guidelines for Exercise Testing and Prescription*. 9th edition. 2014.
- [9] Bird, S. P., Tarpinning, K. M., Marino, F. E. (2005). Designing resistance training programmes to enhance muscular fitness. *Sports medicine*, 35(10), 841-851. <https://doi.org/10.2165/00007256-200535100-00002>
- [10] Iversen, V. M., Mork, P. J., Vasseljen, O., Bergquist, R., Fimland, M. S. (2017). Multiple-joint exercises using elastic resistance bands vs. conventional resistance-training equipment: A cross-over study. *European journal of sport science*, 17(8), 973-982. <https://doi.org/10.1080/17461391.2017.1337229>
- [11] Bergquist, R., Iversen, V. M., Mork, P. J., Fimland, M. S. (2018). Muscle activity in upper-body single-joint resistance exercises with elastic resistance bands vs. free weights. *Journal of human kinetics*, 61(1), 5-13. <https://doi.org/10.1515/hukin-2017-0137>
- [12] Gray, S. E., Finch, C. F. (2016). Assessing the completeness of coded and narrative data from the Victorian Emergency Minimum Dataset using injuries sustained during fitness activities as a case study. *BMC emergency medicine*, 16(1), 24. <https://doi.org/10.1186/s12873-016-0091-4>
- [13] SADLER Sports and Recreation Insurance. (Internet) Available from: <https://www.sadlersports.com/blog/thousands-injured-in-gyms-and-at-home-in-pursuit-of-fitness/>
- [14] Rosignoli, L. M., Regan, K. A., Gray, M. J., Ohning, C. R., Iyer, S. S. (2019). Exercise band-induced lens dislocations: A case series. *American journal of ophthalmology case reports*, 15, 100496. <https://doi.org/10.1016/j.ajoc.2019.100496>

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- [15] Sibley, D., Abdalla, H., Gupta, A., Ho, J. (2020). Exercise in isolating during novel coronavirus 19-A case report of bilateral ocular trauma from elastic resistant bands. *Canadian Journal of Ophthalmology*. <https://doi.org/10.1016/j.cjjo.2020.05.001>
- [16] American College of Sports Medicine. ACSM's health/fitness facility standards and guidelines. 4th ed. Champaign: Human Kinetics; 2012. Available from: <https://books.google.com.mx/books?id=Du96DwAAQBAJlpg=PP17ots=VuPPTadpwmq=16.%09American%20College%20of%20Sports%20Medicine.%20ACSM%E2%80%99s%20health%20fitness%20facility%20standards%20and%20guidelines.%204th%20ed.%20Champaign%3A%20Human%20Kinetics%3B%202012lrlh=espg=PP1v=onpageqf=false>
- [17] Serious Steel Fitness, LLC. Virginia: Pull up band guide; 2016.
- [18] Picha, K. J., Almaddah, M. R., Barker, J., Ciochetty, T., Black, W. S., Uhl, T. L. (2019). Elastic resistance effectiveness on increasing strength of shoulders and hips. *The Journal of Strength Conditioning Research*, 33(4), 931-943. doi: 10.1519/JSC.0000000000002216
- [19] Ramage, E. R., Fini, N. A., Lynch, E. A., Patterson, A., Said, C. M., English, C. (2019). Supervised exercise delivered via telehealth in real time to manage chronic conditions in adults: a protocol for a scoping review to inform future research in stroke survivors. *BMJ open*, 9(3), e027416. doi: 10.1136/bmjopen-2018-027416
- [20] Pimlott, N., Carson, J. (2014). Promoting exercise and preventing injury. <https://www.cfp.ca/content/60/5/404>