

Assessment Feedback Sheet**Student No./Name:** 1702000/ Lee Jamieson**Module Code:** SHSS6085**Module:** Ergogenic performance

Personal Evaluation – to support your academic progress please complete the section below BEFORE submitting your work.									
What do you consider to be the best aspects of this work?	I believe the introduction is rather informative to someone who has no knowledge on the topic								
Which aspects do you consider could have been improved in this piece of work?	The case study I struggled with understanding how to put in								
What have you found most satisfying whilst undertaking this submission?	Over all again I have enjoyed this whole assignment								
ASSESSMENT CRITERIA	Learning Outcomes	GRADE							
		Poor 0-25%	Unsatisfactory 26-39%	Satisfactory 40 – 49%	Good 50 – 59%	Very Good 60 – 69%	Excellent 70 – 85%	Exceptional 86– 100%	%
Case studies and research	1,2,3								15%
Introduction to the EA	1,2,3								20%
Theoretical / scientific detail.	1,2,3								20%
EA usage and potential risks or dangers	1,2,3								20%
Range and scope of references	2								15%
Structure and format of the book (group mark)	1,2,3								10%
It is expected that students will present work that is proof read, correctly referenced and adheres to the Assessment Checklist . Therefore a range of 0 – 10 marks will be deducted for non-completion of any of the points on the checklist below .									
TUTOR COMMENTS:									
Submission date: via Turnitin		Return date: (at least within 4 weeks)		Tutor:			Mark:		

Creatine as an Ergogenic aid

Author: Lee Jamieson**Case study**

Author	Study design	Participants	Intervention	Outcome
Mujika et al, (2000)	Counter movement jump test + Repeated sprint test (15 Metres)	19 male soccer players, 17 completed the study.	Creatine supplementation versus creatine placebo	Significantly faster sprint times within creatine supplement group, No significant differences between jump tests.
Glaister et al, (2006)	Sprint running performance during (15 sprints over 30 metres)	42 nonvegetarian male sports science students	Creatine supplementation versus placebo	Creatine supplementation group experienced higher muscle mass increases and reduction of body fat, no significant differences between sprint times.
Cribb et al, (2007)	1 rep maximum lift strength	31 male body builders	3 groups, Protein, Protein	Participants in the

	between 3 groups		+ carbohydrate, Protein + carbohydrate + creatine supplement	carbohydrate + protein and creatine supplement experienced 40% greater improvements in 1 rep strength maximum lifts
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The purpose of Mujika et al (2000) study was to investigate if a creatine supplement was more beneficial than a placebo of the supplement, it was identified that there had been significant improvements in sprint speed with the creatine supplement versus the placebo supplement, however no significant differences had been identified between the groups when comparing counter movement jump tests. Also, the creatine group had experienced more improvements in muscles mass then the placebo group. Though the jumps seemed to have no improvements to consider important, it can support a common theory of implementing a creatine supplement for improving short bursts of high intensity exercise. during this study, no side effects were shown or reported by any of the participants, creatine is widely talked about due to side effects experienced by participants that have taken a supplementation.

Similar to Mujikas study, Glaister et al (2006) studied the effects of a creatine supplementation versus a placebo in regard to sprinting performance for 15 sprints over a 30-metre distance each sprint. Though there had not been any significant differences between the groups with their sprint times or fatigue rates, there had been significant improvements in increased muscle mass and reductions of body fat with the creatine supplement group, which can relate to Mujika's findings regarding the improved sprint times. There are numerous theories regarding creatine and how it improves the performance of an athlete in gaining muscle mass and the reduction of body fat. These theories will be discussed further on in this study. No side effects had been noted during this study.

By reviewing Cribb et al (2007) it can be noted that when used in combination with carbohydrate and protein supplement, creatine can further improve the strength gains of performers in regards to their 1 maximal repetition lift when compared to either just a protein, or protein and carbohydrate supplement. Again, this supports the theory that creatine is able to help promote better lifting strength when using resistance. Also, no side effects were noted Cribb's study.

Introduction

According to a study by Greenhaff, (1995) creatine had first been discovered in 1835 by Chevreul from extractions of Meat. In 1847 it was noted that creatine was able to be extracted from a number of muscles within the human body but was not found in other organs, (Greenhaff, 1995). Once it was agreed that creatine had been obtainable through diet, it was also revealed that creatine is endogenously manufactured by the liver, pancreas and also kidneys, (Greenhaff, 1995). Creatine is a naturally occurring molecule that is produced by the human body, (Andres et al, 2016). By researching Andres's investigation on creatine, it has been noted that creatine can be derived internally by three amino acids which consist of glycine, arginine and methionine, the fusion begins mainly in the kidneys, and completed by passing through the liver, (Andres et al, 2016). GreenHaff, (1995) explains that around 95% of creatine is delivered to the muscles, Andres et al (2016) goes on to mention the sources of food which is able to deliver additional creatine through consumption. It is noted that vegetarians are receiving less amounts of creatine through diet due to the foods containing this source Being mainly made up of meat, fish, and some other animal products, and the ideal diet for creatine consumption can provide around 50% of the daily intake. (Andres et al, 2016). The body is able to naturally produce around one – two grams of creatine and of these amounts around one to two grams will be extracted through urination, so being able to consume the right foods for this compound is vital for athletes, (Andres et al, 2016). Creatine is engaged by energy metabolism means and is predominantly found within the tissues and organs that require high demands of energy, one mentioned already is the skeletal muscle, others are such as the heart and also the brain, (Andres et al, 2016). Creatine is utilized with the ATP-PC system, phosphocreatine (PCr) aid in quickly re-phosphorylate adenosine diphosphate (ADP) to adenosine triphosphate (ATP), (ATP) which is then used as the energy to support contracting muscles, (Spano et al, 2017, 240). Creatine phosphate can potentially act as a short term storage of (ATP) Adenosine triphosphate, during resting periods (ATP) is mostly produced within the mitochondria, which is the main cell responsible for cellular respiration, and takes the nutrients from the cell to break it down into energy for multiple functions, this is aided from adenosine diphosphate (ADP) throughout oxidative phosphorylation, (Andres et al, 2016). The sarcoplasm process of phosphoryl creatine kinase (CK) is the catalyses the conversion of creatine to creatine phosphate by using (ATP), (Andres et al 2016). When high

demands of (ATP) are required such as muscles being used intensively during exercise, the CK reverse reaction takes place to supply additional (ATP), (Andres et al 2016). These actions are potentially the reasons why creatine could be a short-term storage of (ATP) potential short-term storage of (ATP).

Application and Potential performance enhancing attributes

As mentioned, creatine is an energy source used to allow muscles to contract, this commonly occurs in high intensity activities which last around five to eight seconds (Spano et al, 2017, 240). This knowledge could be useful for athletes who take part in sporting competitions that do not have an extended duration and are wishing to implement a creatine supplement. Implementing creatine into their diet could enable them to perform to their best ability. Foods mentioned that contain creatine are meats such as steak, chicken, and fish, as well as manufactured supplements in which performers are able to purchase easily to gain an increased dosage through oral consumption by a pill or powder. A popular strategy for athletes to implement a creatine supplement into their diet is by beginning with 20 grams per day for five to seven days for a pre load approach, once this stage has passed the individuals tend to stick to the recommended three to five grams until they no longer use it, (Spano et al, 2017, page 240). Though it is also known for individuals to exceed the recommended dosages by consuming around one to 27 grams during the maintenance phase, however it is limited by the skeletal muscle and how much can be stored as mentioned and any excess will be passed through urination, (Spano et al, 2017, Page 240). Spano et al (2017) explains that implementing a creatine supplement can benefit a sports performer greatly dependent on sport. It is stated the greatest amount of supporting evidence for performance enhancements involve anaerobic sports, especially sports that involve a lot of repeated short bursts of high intensity. However insufficient evidence is provided to support its benefits with long term aerobic events, for example long distance running, (Spano et al, 2017, page 240). Another way creatine can benefit performers is by aiding in strength gains and improving lean body mass, these can be linked to the ability to

sustain a higher intensity exercise for longer, and the lean body mass improvements can be down to how creatine aids in retaining fluid in the muscles, (Spano et al, 2017, 240).

Contradictions and risks

Though there are great benefits noted about implementing a creatine supplement into the diet, there are of course some potential risks to health when using the supplement. Spano et al, (2017 page 241) discusses the fact that there have been some controversy on the supplement when used by individuals aged under 18 years old and it is recommended for those in this category to consult a doctor or parent before implementing this supplement into their diet. According to Spano et al (2017) there seem to be no current recorded short term health effects related to the kidney, liver or cardiac, or muscle function when used by healthy adults, a statement which caused controversy over the use of this supplement, (Spano et al, 2017, page 241). It should be understood that when using dosages over 3 to 5 grams per day, individuals who have or are experiencing renal diseases or with some disease that is able to affect kidneys, for example hypertension and also diabetes, a potential weight gain may be an occurrence, (Spano et al, 2017, page 241). There are some sports which this could potentially affect more than others, for example sports which have weight categories such as mixed martial arts and lifting sports. Juhn, (2003) indicates that for sports involving running as the primary action, there are several studies that are not able to support creatine in improving running sprints and also swimming activities. This again can be linked to the potential weight gain provided by creatine, especially if an excessive amount is consumed due to the intra and extra-cellular water retention which creatine provides, (Juhn, 2003). Another problem associated and which seems to be a re occurrence in some studies investigating creatine are muscle cramping. Juhn, (2003) goes on to identify muscle dysfunction, glomerular filtration and also serum creatinine problems occurring throughout numerous studies, however these studies are noted to last for longer than 10 weeks, and were reversible when consisting of 10 weeks or less, (Juhn, 2003). Though these can be occurring problems, it should be considered that the findings that involved the glomerular filtration and serum creatinine problems were also present in participants exceeding the

common 3 to 5 gram dosages and also some participants were known to have previous renal diseases. However as it is common for sports participants to feel the urge to increase their dosages of certain supplements as they believe it will give more benefits, Juhn, (2003) mentions that this should be avoided with the use of creatine to avoid the potential risks and dangers.

Summary

To conclude, it can be recommended to implement a creatine supplementation for sports performers who are looking to achieve their fullest athletic potential with minimal risks, though there is a lot of controversy on this ergogenic aid. Research suggests that there are limited amounts of studies highlighting any risks experienced during their investigations, and when occurring the main problems are associated with extreme overdosing and also previous and current diseases with the individual. Though it cannot be fully guaranteed that there are no potential risks occurring, it can be seen as one of the safest ergogenic aids if used correctly.

References

Andres S, Ziegenhagen R, Trefflich I, et al. (2016). 'Creatine and creatine forms intended for sports nutrition'. Mol Nutr Food Res, vol 61(6). DOI:10.1002/mnfr.201600772

(Accessed 16th May 2020)

Cribb, P.J., Williams, A.D. and Hayes, A. (2007). 'A creatine-protein-carbohydrate supplement enhances responses to resistance training'. Medicine & science in sports & exercise, vol 39 (11), pp.1960-1968. Available at:
<http://vuir.vu.edu.au/1059/1/MSSE2007b.pdf>

(Accessed 16th May 2020)

Glaister, M., Lockey, R.A., Abraham, C.S., Staerck, A., Goodwin, J.E. and McInnes, G. (2006) 'Creatine supplementation and multiple sprint running performance'. *The Journal of Strength & Conditioning Research*, vol 20(2), pp.273-277. Available at: <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.477.2812&rep=rep1&type=pdf> (Accessed 15th May 2020)

Greenhaff, P. L. (1995) 'Creatine and Its Application as an Ergogenic Aid'. *International Journal of Sport Nutrition*, vol 5(1), pp.100-110. DOI: 10.1123/ijns.5.s1.s100 (Accessed 14th May 2020)

Juhn, M.S. (2003) 'Popular Sports Supplements and Ergogenic Aids'. *Sports Med*, vol 33, pp. 921–939. DOI: <https://doi.org/10.2165/00007256-200333120-00004> (Accessed 15th May 2020)

Marie A. Spano, Laura J. Kruskall, D. Travis Thomas (2017) *Nutrition for sport exercise and health*, Human Kinetics. Leeds: Human Kinetics.

Mujika, I., Padilla, S.A.B.I.N.O., Ibanez, J.A.V.I.E.R., Izquierdo, M. and Gorostiaga, E.S.T.E.B.A.N. (2000). 'Creatine supplementation and sprint performance in soccer players'. *Medicine & Science in Sports & Exercise*, vol 32(2), pp.518. Available at: <https://pdfs.semanticscholar.org/ccba/44f3b0a7841a369e0dd8f5e70c0374723e9b.pdf> (Accessed 14th May 2020)