Guidance notes for using the medium chain triglyceride ketogenic diet (MCTKD) calculator

1. Brief overview of the MCTKD

In the MCTKD, the percentage of total daily energy requirements provided from medium chain triglyceride (MCT), long chain triglyceride (LCT), protein and carbohydrate is used to express their relative distribution.

The choice of percentage contribution from each macronutrient is from ranges typically used in the MCTKD. E.g. for MCT, 45 - 50% of daily energy requirements is likely to achieve gastrointestinal tolerance and good ketosis (Neal 2012).

Daily energy requirements are central to the dietary prescription together with the chosen percentages of macronutrients. A dietitian calculates a MCTKD on a specific basis to meet the unique dietary needs of the individual.

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2. Using the MCTKD calculator

- *Screen One – Enter this information, specific to the individual*

  1. Daily energy requirement (kcal).
  2. Using the slider, select the chosen % of daily energy from MCT (from between 30 – 60%).
  3. Repeat for protein (9 – 15%).
  4. Repeat for carbohydrate (9 – 19%).
  5. N.B. By default, to equal a total of 100%, the remainder is allocated to % of energy from LCT.

- *Press 'proceed'*

- *Screen Two – Summary per day*

  6. The following is displayed for each macronutrient:
     a. The % selected on screen one.
     b. The amount in grams.
     c. The energy provided in kcal (N.B. The energy value used for MCT is 9kcal per gram).

  7. The calculator converts the daily amounts of grams of protein, carbohydrate and LCT into macronutrient food 'choices' (Section 3)

Your next steps…

- **MCT**

Convert the daily quantity of MCT calculated in grams into equivalent amounts of MCT oil, emulsion, or powder, either singly or in combination. To promote ketosis and gastrointestinal tolerance, MCT is best divided up into equal portions and given regularly throughout the day with food, as part of meals and snacks.

- **Devise the daily meal plan**
Distribute the macronutrient choices evenly into the required number of meals and snacks to form a daily meal plan for the individual.

- **Visit www.myketogenicdiet.com** for ideas and recipes for meals, snacks and drinks for the MCTKD.

3. Guidance on using the food choices system in the MCTKD

The MCTKD calculator converts the daily amounts in grams of protein, carbohydrate and LCT into macronutrient food 'choices' (or exchanges). Each choice is a weighed or measured portion of food containing specific amounts in grams of one or more of the macronutrients. Food choices are used in the MCTKD to:

- Control macronutrient and energy intakes on an individual basis.
- Aid even distribution of macronutrients throughout the daily meal plan.
- Facilitate flexibility, choice and variety in the diet.
- Guide and simplify the planning of meals and snacks.

The choices system used in the MCTKD takes into consideration that whilst some foods consist of a single macronutrient, e.g. olive oil (LCT), others are varying proportions of two, e.g. egg (protein and LCT), or all three, e.g. yogurt (protein, carbohydrate, LCT). The amount of food in grams per choice containing the desired amount of protein, carbohydrate and/or fat (LCT) can be calculated using known macronutrient composition per 100g from food labels or nutritional composition tables. Alternatively, lists of choices are available (Fitsimmons and Sewell 2015, Neal 2012). Most foods can therefore be incorporated into a MCTKD.

Grams of protein, carbohydrate and LCT typically used in food choices in the MCTKD

Macronutrient	Grams (g) per choice
Protein* ('Fat adjusted' to contain an average of 3g of LCT)	6
Carbohydrate	1, 5 or 10
Fat (LCT)	5

*Protein choices are 'fat adjusted'

When using the App you will notice the number of 5g LCT choices generated is different from that expected from the grams of LCT calculated. This 'missing' amount is equivalent to the number of protein choices multiplied by three. This is to account for differences in the naturally occurring fat content of protein foods. For example, a cheddar cheese or boiled egg choice has more inherent fat than a chicken breast or lean beef choice, although each provides 6g protein.

Therefore, 'fat adjustment' is made so each protein choice contains average of 3g of fat. A source of LCT, e.g. oil, butter, ghee, or mayonnaise, is added to lower fat protein foods when used in meals and snacks. By subtracting this fat from the grams of LCT calculated initially, then converting the result into the right number of 5g LCT choices, the MCTKD calculator ensures equity in the LCT and energy content of each protein choice.

Fruits and vegetables

The predominant macronutrient in fruits and vegetables is carbohydrate, reflected in the food choices system. However, many varieties contain significant amounts of low biological quality protein. Depending on local ketogenic diet policy, or individual nutritional requirements, this protein may, or may not, be included as part of the total protein of the diet.

4. Practical dietetic references for the MCTKD and examples of food choices

Fitzsimmons, G. and Sewell, M. Ketogenic diets. Chapter 16. Clinical Paediatric Dietetics. 4th Edition. Editor: Vanessa Shaw. John Wiley and Sons Ltd, Chichester UK. ISBN: 978-0-470-65998-4. 2015.

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Neal, E. The medium chain triglyceride diet. Chapter 9. The dietary treatment of epilepsy – practical implementation of ketogenic therapy. Editor Elizabeth Neal. Wiley-Blackwell. Oxford, UK. ISBN 978-0-470-67041-5. 2012.

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