The complementary feeding (CF) period is a short transitional period from breastfeeding and formula feeding to family foods. Timing, quantity, and quality are implied to impact growth and obesity risk through changes in energy and nutrient intakes due to flavor shaping and other mechanisms. CF is influenced by concurrent and previous feeding (breastfeeding and formula feeding) which also impact growth. All aspects of CF timing, quantity, and quality are also influenced by infants (e.g., genetics) and environmental factors (e.g., socioeconomic status and parental feeding style) that partly interact (Fig. 1).

We analyzed data of monthly food diaries of more than 1,000 children from 5 European countries in the first 2 years of life with similar infant feeding recommendations, which were collected as part of the prospective European Childhood Obesity Project (CHOP Study) [1]. While the recommendations state that CF should not start before 6 months of age (World Health Organization) or between 4 and 6 months of age (e.g., ESPGHAN [2]), timing varies considerably together with the quantity and quality of complementary foods [1, 3, 4]. Timing depended on previous and concurrent feeding (breastfeeding and formula feeding), country of residence, socioeconomic status, smoking in pregnancy, birth weight, and other factors [4]. Formula-fed children, for instance, start approximately 2 weeks earlier in Europe than breastfed children and in almost 40% at or before 4 months of age [1]. While introduction of solids between 4 and 6 months or after 6 months does not seem to impact growth and later obesity risk [4], solids before 4 months of age increase the risk: odds ratio for obesity 1.33, 95% confidence interval (CI) 1.07–1.64 [5]. There are indications that this is especially problematic for formula-fed children. For these children, complementary foods seem to add energy to their diet [4]. In a comparison of children eating solids with those being exclusively formula fed, we have shown that solid eaters had generally high energy
intakes, varying between +96 kcal/day (95% CI 64–128 kcal/day) at 3 months of age and +87 kcal/day (95% CI 42–133 kcal/day) at 6 months of age [4].

During the CF period, fat intake decreases, and protein and carbohydrate intakes increase. Protein intake often exceeds European recommendations from 9 months onwards [4]. However, while there are indications that high dairy protein intakes during CF play a role in weight gain, randomized controlled trials are lacking. Also, the role of increasing carbohydrate intake on metabolism and flavor shaping and later growth needs to be further evaluated to draw any conclusions. Depending on the region, commercial infant foods and self-cooked products have a different share on infant intakes; both generally show differences in nutrient content and variety, with commercial products having generally a lower variety and higher carbohydrate content.

Only few studies related the mode of feeding (e.g., responsive feeding or baby-led feeding) during CF to growth. In general, these findings are not conclusive and studies are still ongoing. There are indications that responsive feeding – as recommended by WHO guidelines – is beneficial for favorable growth. In summary, no benefit or disadvantage has been
shown in terms of growth to start complementary foods either between 4 and 6 or after 6 months of age, but early introduction of complementary foods before 4 months of age should be avoided, supporting current recommendations [6]. The impact of CF quality on short-term growth and later obesity risk has to be elucidated further.

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