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DIETARY THERAPY OF CHRONIC INFLAMMATORY DISEASES OF THE COLON IN MIDDLE SCHOOL-AGED CHILDREN

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ABSTRACT

To choose the most appropriate therapeutic strategy for inflammatory bowel disease (IBD), it is necessary to determine the degree of inflammatory activity and its localization. Diet and nutrition should aim to support normal growth, bone mineralization, age-appropriate pubertal development, and social adaptation . Nutritional therapy is tailored according to the patient's age, the severity of inflammation, and its extent and localization. Traditionally, dietary management during acute exacerbations of chronic pediatric IBD is based on Pevzner Diet No. 4, while during remission, nutrition approximates the standard diet for the child's age group .

Foods that increase gas production, stimulate intestinal secretion and motility, increase stool volume, or contain high amounts of coarse dietary fiber are excluded. Protein intake should be increased primarily through boiled meat, fish, and eggs. Protein requirements are calculated based on disease severity (approximately 0.8–1.1 g/kg body weight/day). In severe cases with significant protein deficiency, intake may be increased to 1.5 g/kg/day. In cases of secondary enteropathy with protein loss, intake can exceed 1.5 g/kg/day, then gradually reduced as the child's condition improves . During acute exacerbations, milk and dairy products are excluded .

KEY WORDS: dietary therapy, colon diseases in children, inflammatory process, dietology, intestinal diseases.

Acute Phase Nutrition (Diets No. 4a, 4b)

Excludes fatty, spicy, and fried foods; hard-to-digest animal fats, margarine, smoked meats, sausages, spices and condiments (e.g., ginger, pepper, ketchup, vinegar, horseradish, mustard, mayonnaise), pickled vegetables, nuts, mushrooms, pancakes, fresh bakery products, dark bread, coffee, cocoa, chocolate, carbonated drinks, ice cream, chewing gum, chips, whole fruit juices, raw vegetables and fruits, cabbage, sauerkraut, turnip, radish, spinach, sorrel, beets, bell peppers, plums, prunes, melons, grapes, kiwi, pearl barley, millet, as well as milk and dairy products, except for clarified butter.

Recommended foods: non-dairy cereals (rice, buckwheat, oatmeal, corn, semolina), eggs in dishes, omelets, lightly cooked vegetable soups, boiled or steamed lean meat and fish, white bread from premium flour (day-old or toasted, without crust), plain biscuits and rusks, corn or rice sticks, potatoes and low-fiber vegetables (carrots, zucchini, pumpkin, cauliflower, broccoli) – boiled, steamed, or pureed; peeled ripe fruits and berries, fruit purees, compotes, jelly, and kissel. Foods should be steamed, boiled, pureed, or mashed and served warm. Feeding frequency: six times a day.

Remission Phase Nutrition (Diet No. 4v)

Foods are given in pieces rather than pureed. Fruit juices (apple, pear, apricot, peach, banana) should be diluted 1:1 with water. Limited sweets (marshmallow, marmalade, jellies, wafers with fruit filling, fruit candies, honey, jams, preserves) are allowed. If no allergies are present, berries

such as raspberries, strawberries, and citrus (peeled and membranes removed), as well as fresh peeled cucumber and tomato, may be introduced. Lightly cooked herbs (dill, parsley, cilantro, oregano, basil, tarragon) can be added at the end of cooking for 3–5 minutes. Dairy products may be reintroduced only after at least six months of stable remission, including hard, non-spicy cheeses, low-fat fresh curd in baked dishes, and tolerable fermented milk products (kefir, yogurt) enriched with probiotics (Lactobacillus and Bifidobacterium strains).

Selection of an Appropriate Nutritional Formula

In young children with chronic IBD, specialized formulas based on protein hydrolysates with modified fat components (medium-chain triglycerides, MCTs) and carbohydrates (maltodextrin, modified starch, glucose polymers) are recommended. For infants, products such as Pregestimil (Mead Johnson), Nutrilon Pepti MCT (Nutricia), Alfare (Nestle), and Nutrilak Peptidi MCT ("Nutritek") are suitable. For children over one year, Peptamen Junior (Nestle) can be used up to age 10. For steatorrhea type 1, pancreatic insufficiency, or insufficient weight gain, fat emulsions such as Liquigen (Nutricia) may be recommended. Dosage is individualized based on age, weight, and clinical status. For children under five, Liquigen should be diluted with water or added to food.

Whole-protein formulas are suitable during remission for children over one year. They are more palatable, balanced in fat and protein, lactose-free, low in osmolality (200–300 mOsm/L), and enriched with vitamins and minerals according to age. Examples include Nutrin Junior, Nutrin with fiber, and Nutrin Energy. Protein composition is typically 60% whey and 40% casein; carbohydrates are mainly maltodextrin with low glycemic index; 30% of fat comes from polyunsaturated fatty acids (PUFAs) with an omega-6:omega-3 ratio of 4:1. Fiber complexes (MF6) act as prebiotics, regulating bowel function and reducing diarrhea or constipation duration.

For children aged 1–10 years, Clinutren Junior or Clinutren Optimum (from 6 years) provide 50:50 whey:casein, 20–25% MCTs, and carbohydrates from sucrose and maltodextrin with physiological osmolality.

Recent studies also examine immunomodulating formulas enriched with transforming growth factor beta-2 (TGF-β2), which supports intestinal epithelial growth and immune regulation while suppressing pro-inflammatory cytokines. Modulen IBD (Nestle) contains casein, milk fat, MCTs, and glucose polymers, is lactose-free, fortified with minerals and vitamins, and provides 100 kcal/100 mL, with over 24 μg/L TGF-β2. In a UK cohort study of 29 children aged 8–17 years with Crohn's disease, 75% achieved prolonged remission with Modulen IBD over eight weeks, with improvements in C-reactive protein, IL-1β, interferon-γ, and TGF-β levels, as well as an average weight gain of 3.2 kg.

Maintaining remission can be supported by additional home enteral nutrition (30 kcal/kg/day), including nocturnal feeding, which prolongs remission and reduces relapse frequency. Omega-3 PUFAs are recommended for their anti-inflammatory effects.

Dietary Management of Food Intolerances

During both acute and remission phases, food intolerances require timely diagnosis and dietary correction. Lactase deficiency often accompanies Crohn's disease exacerbations.

Lactose-free formulas are necessary during flares; restrictions during remission are only needed for confirmed lactase deficiency. Cow's milk protein sensitization is more common in ulcerative colitis, requiring strict avoidance. Amino acid-based or hydrolyzed formulas with reduced allergenicity (e.g., Neocate, SHS-Nutricia) are preferred for sensitized children.

Fat malabsorption, especially after ileal resection, requires substitution with 50–60% of fat as MCTs, which are absorbed without bile salts (e.g., Liquigen).

Organization of Nutrition and Nutritional Support

Children with IBD often have deficiencies of iron, vitamin B12, fat-soluble vitamins (A, D, E, K), folic acid, and zinc. Both parenteral and enteral nutrition have shown efficacy. Indications for parenteral nutrition include chronic partial bowel obstruction, fistulas, acute toxic colonic dilation, and pre-/postoperative periods .

Enteral nutrition (EN) is preferred in pediatric patients, effectively inducing remission, correcting undernutrition, anemia, and hypoalbuminemia, with growth and weight gain superior to steroid therapy. EN formulas can be categorized as:

1. **Amino acid-based (elemental diets)** – hypoallergenic, high osmolarity, suitable for oral or tube feeding (e.g., Neocate Advanced, Vivonex Pediatric).
2. **Protein hydrolysate-based (semi-elemental)** – low antigenicity, low/absent lactose, easily absorbed oligopeptides (e.g., Nutrilon Pepti, Peptamen Junior).
3. **Whole-protein (polymeric) diets** – balanced macronutrients, palatable, lower cost, retain allergenicity; suitable for children >1 year (e.g., Nutrin, Clinutren Junior, Nutrien Junior).

Comparative studies suggest all three types achieve similar remission rates (67–73%) in adults, though pediatric-specific randomized trials are limited. Flavor additives can improve palatability but may increase osmolality or provoke allergic reactions; carrageenan may trigger intestinal inflammation and should be avoided in Crohn's patients.

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