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Sport and Physical Activity in People With a Stoma and After Ostomy Surgery: A Narrative Review

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Abstract

Background: Ostomy surgery — colostomy, ileostomy, or urostomy — entails anatomical, metabolic, and psychosocial changes that may discourage participation in sport. Reduced physical activity appears common in this population, although the stoma itself is seldom a genuine contraindication to exercise.
Aim: To synthesise current knowledge on the safety, benefits, barriers, and recommendations concerning sport and physical activity in patients after ostomy procedures.
Material and methods: A narrative review was undertaken. Searches in PubMed, Scopus, Web of Science, and the Cochrane Library identified guidelines, reviews, and primary studies addressing physical activity, abdominal exercise, parastomal hernia, fluid and electrolyte balance, and psychosocial adaptation in people living with a stoma.
Results: The available literature suggests that appropriately tailored activity may improve quality of life, fatigue, and physical fitness, whereas inactivity is widespread and often related to fear of parastomal hernia, altered body image, and depressive symptoms. Recurring themes include graded core-focused training, avoidance of uncontrolled rises in intra-abdominal pressure, hydration strategies for ileostomy, and protective measures for contact sports. The evidence base remains limited and heterogeneous, with few randomised trials.
Conclusions: Sport appears generally feasible and potentially beneficial after ostomy surgery when individualised and supported by interdisciplinary care. Adequately powered trials are needed to define optimal training protocols.

Keywords: stoma; ostomy; physical activity; exercise; parastomal hernia; quality of life

1. Introduction

1.1. Definition and epidemiology: types of stoma and the main indications for their formation

A stoma is a surgically created opening that connects the lumen of a hollow organ with the surface of the abdominal wall, enabling the diversion of intestinal contents or urine to the exterior [1]. In the case of an intestinal stoma, a segment of bowel is exteriorised and its mucosa sutured to the skin, producing a deliberate, artificial outlet through which faeces are evacuated when the physiological route cannot be preserved [1]. The term derives from the Greek word for "mouth," and the procedure has accompanied abdominal surgery for more than two centuries; although surgical technique, appliances, and stoma care have evolved considerably, the intestinal stoma remains an indispensable element of contemporary surgical practice [1, 2].

Intestinal stomas are conventionally classified according to the bowel segment that is brought to the surface and to the technique used to fashion them [2]. Small-bowel stomas (ileostomies) are generally sited in the right abdomen, whereas large-bowel stomas (colostomies) are most often placed in the left abdomen [2]. A further distinction is drawn between end stomas, in which the bowel is divided and the proximal stump exteriorised, and loop stomas, in which the anterior wall of an intact loop is opened to create the outlet; both may be intended as temporary or permanent [2]. Continent variants, such as the Kock pouch, together with the various forms of ileoanal reservoir, broaden this spectrum, while urinary diversion—classified as continent or non-continent according to the handling of the urine reservoir—constitutes a distinct category [2, 3]. Urostomy, the third principal type alongside colostomy and ileostomy, is most frequently created after radical cystectomy for bladder cancer and may also be required in a number of non-oncological conditions [3].

The indications for stoma formation are diverse, although malignancy tends to predominate. Colorectal cancer is generally regarded as the leading cause: more than three-quarters of all intestinal stomas appear to be created in the context of colorectal cancer treatment [2], and this malignancy has been estimated to account for roughly half of all intestinal stomas [3]. Beyond oncology, stomas are fashioned for inflammatory bowel disease—encompassing Crohn's disease and ulcerative colitis—as well as for diverticular disease, intestinal obstruction or perforation, anastomotic leakage, trauma, faecal incontinence, and a range of less common congenital and acquired disorders affecting both adults and children [1, 3, 4]. Inflammatory bowel disease tends to occur in younger adults, whereas colorectal cancer is more frequently diagnosed in older age, so that the stoma population spans the whole of adult life and beyond [3, 4].

Reliable global estimates of stoma prevalence are difficult to obtain, partly because reporting practices and health systems vary [4]. Nonetheless, the available figures convey the scale of the issue: in the United States more than 100,000 stomas are reported to be created each year [4], while in Poland approximately 6,000 intestinal stomas are formed annually and around 20,000 people are estimated to live with one, the majority of them women [1]. Stoma-related complications are common and may affect quality of life, necessitate further surgery, or contribute to mortality [4]. Their reported incidence varies widely—from around 10% to 70% in narrative summaries [2]—and a systematic review of randomised controlled trials documented rates ranging from 2.9% to 81.1%, with peristomal skin complications and parastomal hernia emerging as the most frequent, and end colostomy carrying the highest overall morbidity [5]. This heterogeneity reflects both genuine differences between stoma types and inconsistencies in how complications are defined and detected [5].

The choice of stoma type itself carries consequences that are relevant to subsequent physical functioning. In rectal cancer surgery, a temporary diverting stoma is frequently fashioned to protect a low anastomosis and to attenuate the clinical impact of anastomotic leakage [6]. A meta-analysis comparing loop ileostomy with loop colostomy after anterior resection found no significant difference in overall morbidity or mortality, but suggested that ileostomy may be associated with higher rates of dehydration, electrolyte disturbance, high output, and renal insufficiency, whereas colostomy may be associated with more stoma prolapse, retraction, and incisional or parastomal herniation [6]. These divergent profiles—metabolic vulnerability on the one hand and mechanical, abdominal-wall vulnerability on the other—foreshadow the principal considerations that shape the resumption of sport after ostomy surgery [6].

1.2. Significance of the problem: the role of physical activity in convalescence and overall patient functioning

Physical activity is defined by the World Health Organization as any bodily movement produced by skeletal muscles that requires energy expenditure; exercise represents a planned, structured, and repetitive subset undertaken to maintain or improve physical fitness, while sport generally denotes competitive, rule-governed forms of activity [3, 7]. For adults, current guidance recommends 150–300 minutes of moderate-intensity, or 75–150 minutes of vigorous-intensity, aerobic activity per week, complemented by muscle-strengthening activity on two or more days; importantly, this guidance explicitly extends to people living with chronic conditions or disability, who are encouraged to be as active as their abilities allow, and it emphasises that some activity is better than none and that pre-exercise medical clearance is generally unnecessary in the absence of contraindications [7]. These principles provide a relevant reference frame for a population that, although altered anatomically, is rarely precluded from exercise on physiological grounds alone [7].

In people living with a stoma, the return to physical activity is increasingly regarded as an indicator of recovery and quality of life, and it may confer benefits for aerobic fitness, cancer-related fatigue, and several domains of health-related quality of life [3]. At the same time, stoma surgery appears to be linked to a reduction in physical activity, which in turn has been associated with diminished physical fitness, difficulties with activities of daily living, and poorer quality of life [8]. Colon cancer survivors with a stoma have been reported to be less physically active than survivors without one, and to display measurable deficits in lower-limb muscular strength, endurance, and flexibility relative to healthy peers [8]. Such observations suggest that inactivity, rather than the stoma itself, may underlie much of the functional decline experienced after surgery [8].

Rehabilitation following stoma formation is best understood as encompassing both physical and psychological dimensions; from this perspective an ostomy is not, in itself, a handicapping procedure, and with appropriate preparation, education, and support, living well—and actively—with a stoma is considered achievable [9]. Yet the resumption of sport sits at the intersection of altered abdominal-wall anatomy, modified intestinal physiology, and psychosocial adjustment, a combination that makes it a distinctive rehabilitation challenge rather than a simple return to previous habits [1, 2, 3]. Clarifying how this challenge can be met safely, and what benefits may follow, is therefore of relevance not only to patients but also to the clinicians and exercise professionals who support them [3, 9].

1.3. Aim of the work

Despite growing recognition that physical activity is important for general health, the advice offered to people with a stoma about exercise and sport appears to be frequently inconsistent, overly cautious, or contradictory, and a substantial gap persists in the knowledge base of the professionals who care for them [10]. Where formal recommendations have recently begun to emerge, their authors note that they rest largely on clinical experience and expert opinion in the face of limited primary research [10]. Consistent with this, a recent scoping review concluded that the evidence on returning to physical activity after stoma surgery remains limited and heterogeneous, dominated by studies of adults and oncology patients and including few randomised trials [3].

Against this background, the aim of the present narrative review is to systematise the current state of knowledge regarding the safety, benefits, barriers, and recommendations concerning the practice of sport by patients after ostomy surgery [3, 10]. In doing so, the review seeks to draw together evidence on the anatomical, metabolic, and psychosocial consequences of stoma formation, on the obstacles that discourage activity, and on the practical strategies—from graded core training to fluid–electrolyte management and protective equipment—that may enable a safe and beneficial return to exercise [3, 10].

2. Methodology of the review (Information retrieval)

This work was conducted as a narrative review, an approach considered appropriate for a subject in which the primary evidence is comparatively scarce, dispersed across disciplines, and methodologically heterogeneous [3]. Rather than aiming to quantify a single, well-defined effect, the review sought to map and integrate the available knowledge on sport and physical activity after ostomy surgery, drawing on surgical, gastroenterological, rehabilitative, nursing, and sport-science literature [3, 10]. A structured—though deliberately inclusive—search of the electronic databases described below was therefore undertaken, supplemented by manual screening of the reference lists of the most relevant retrieved articles in order to identify additional sources [10].

2.1. Inclusion and exclusion criteria

Publications were considered eligible if they addressed adults living with, or undergoing surgery for, an intestinal or urinary stoma and reported information relevant to physical activity, exercise, sport, rehabilitation, abdominal-wall function, parastomal herniation, fluid and electrolyte balance, or psychosocial adaptation in this population [3, 10]. Given the limited and dispersed nature of the evidence, no strict restriction was placed on the year of

publication; nevertheless, contemporary guidelines and recent syntheses were prioritised where available, while older works were retained when they provided foundational or otherwise unique information [3]. Only documents available in full text and published in English were included.
The evidence base interrogated for this review was intentionally broad and methodologically diverse. It encompassed international clinical practice guidelines and best-practice recommendations [10, 11, 12]; systematic reviews and meta-analyses [5, 13]; scoping and narrative reviews of the literature [3, 14, 15]; observational research, including cross-sectional surveys and cohort analyses [8, 16]; interventional and feasibility studies [17]; and qualitative inquiries, case reports, and doctoral research [18]. Editorials, letters to the editor, conference abstracts, and publications whose full text could not be obtained were not considered, as were studies that did not address any aspect of stoma care relevant to physical functioning or activity [3].

2.2. Databases

The literature search was carried out across four major bibliographic databases—PubMed (incorporating MEDLINE), Scopus, Web of Science, and the Cochrane Library—selected for their complementary coverage of biomedical, nursing, and sport-science publications [13]. This choice was consistent with the databases interrogated in comparable syntheses addressing physical activity and stoma care, which have typically combined general biomedical resources with nursing-specific and multidisciplinary indices [3, 13]. To reduce the risk of omitting relevant guidance and grey literature, the searches were complemented by targeted retrieval of best-practice documents issued by professional and specialist organisations and by backward citation searching of key reviews and recommendations [10, 12].

2.3. Keywords and search queries

The search strategy combined controlled vocabulary and free-text terms describing, on the one hand, the stoma population and, on the other, physical activity and its principal clinical correlates, linked by the Boolean operators AND and OR [3]. Population terms included "stoma," "ostomy," "colostomy," "ileostomy," "urostomy," "enterostomy," and "parastomal," while the activity and outcome terms included "physical activity," "exercise," "sport," "return to sport," "physical fitness," "training," "rehabilitation," and "abdominal exercise," together with terms capturing the most relevant consequences and barriers, such as "parastomal hernia," "quality of life," "body image," "dehydration," "fluid and electrolyte balance," and "high-output stoma" [3, 10]. A representative query took the following form:
("stoma" OR "ostomy" OR "colostomy" OR "ileostomy" OR "urostomy" OR "enterostomy" OR "parastomal") AND ("physical activity" OR "exercise" OR "sport" OR "return to sport" OR "physical fitness" OR "training" OR "rehabilitation" OR "abdominal exercise") AND ("parastomal hernia" OR "quality of life" OR "body image" OR "dehydration" OR "fluid and electrolyte balance" OR "high-output stoma").
This string was adapted to the syntax and indexing conventions of each individual database, and the resulting records were screened by title and abstract and subsequently by full text against the criteria outlined above, with the final corpus selected on the basis of thematic relevance to the practice of sport and physical activity by patients after ostomy surgery [3, 10].

3. Anatomical and physiological changes and the biomechanics of exertion

3.1. Interference with the abdominal wall: division of the rectus or oblique muscles and its effect on core stability and the abdominal press

The abdominal wall comprises the medially located rectus abdominis, which extends from the pubis to the sternum, together with the three layered flank muscles—external oblique, internal oblique, and transversus abdominis—that encircle the lower torso between the thoracolumbar fascia and the linea alba [18]. With the diaphragm and the pelvic floor, these structures constitute what is commonly termed the "core," understood as the muscles and connective tissue of the entire abdominal wall and pelvic floor [10]. Functionally, they generate and modulate intra-abdominal pressure—the abdominal press—stabilise the trunk during movement of the limbs, and transmit load between the thorax and the pelvis during both everyday and athletic activity [10, 18].

The creation of a stoma necessarily disrupts this arrangement. By convention the bowel is delivered through a trephine that passes through, or lateral to, the rectus abdominis [2, 18]. Fashioning that aperture entails dividing the rectus sheath and muscle, or the oblique layers, leaving a permanent defect in an otherwise continuous myofascial envelope [18]. The transversus abdominis in particular is regarded as a key trunk stabiliser that is normally recruited during movements of the extremities, and a deep abdominal contraction such as the abdominal drawing-in manoeuvre is thought to reflect this stabilising role [18].

The functional consequences of this breach are not yet fully characterised. It has been hypothesised that stoma formation weakens the abdominal wall and may predispose to herniation, and imaging has documented alterations of the rectus abdominis—including thickening—on the side of the stoma [18]. Direct measurements, however, have not consistently confirmed a localised deficit: in a descriptive study using electromyography and ultrasonography within the first twelve weeks after surgery, no clear difference in transversus abdominis thickness or activity was found between the stoma side and the contralateral side, which suggests that any weakening may be bilateral and attributable to surgery and deconditioning in general rather than confined to the stoma site [18]. Postoperative bed rest and deconditioning are themselves associated with a broad decline in muscle function, and may compound these changes [18].

Against this background, abdominal and core exercise has attracted interest as a means of restoring stability and, potentially, of counteracting any abdominal-wall weakness that follows surgery [18, 19]. One proposed mechanism is that strengthening the abdominal musculature, together with training of controlled breathing, improves the regulation of intra-abdominal pressure and thereby affords better protection to the vulnerable aperture [19]. Contemporary best-practice recommendations accordingly position appropriate abdominal and pelvic-floor exercise as relevant for essentially all individuals undergoing stoma surgery, while stressing that load and progression must be matched to the stage of recovery [10, 18]. Electromyographic work suggests that, in the first two weeks after surgery, comparatively few patients achieve substantial activation of the abdominal muscles—the rectus abdominis especially—whereas from roughly two to twelve weeks several exercises, particularly isometric movements with an adjustable load, appear to engage the oblique and deep abdominal muscles in most patients [18]. These observations indicate that core training is best conceived not as a single prescription but as a graded process, a theme developed further in Section 6 [10, 18].

3.2. Risk of parastomal hernia (PH)

Parastomal hernia is defined as an abnormal protrusion of the contents of the abdominal cavity through the abdominal-wall defect created during stoma formation, and is widely regarded as one of the most common—by some accounts almost unavoidable—late complications of a stoma [4]. Its reported incidence varies considerably according to stoma type, method of detection, and duration of follow-up: clinically evident parastomal hernia after colostomy has been reported in up to around 39% of patients, while cross-sectional imaging detects asymptomatic herniation in a substantially higher proportion [4]. End colostomy tends to carry the highest incidence, a pattern reflected both in society guidelines and in systematic reviews of stoma-related morbidity [4, 5, 11]. Estimates of parastomal *bulging*—a broader term that also encompasses subcutaneous prolapse and a generally weak abdominal wall—are correspondingly high, with around one third of patients affected within the first year and roughly half within two years [12, 18].

The mechanism of herniation is closely tied to the balance between the structural integrity of the abdominal wall and the intra-abdominal pressure acting upon it [20]. Recognised risk factors largely converge on this balance: obesity, which is associated with chronically elevated abdominal-wall tension and reduced abdominal-wall strength; a fascial aperture that is too large; advancing age and changes in collagen; and conditions that repeatedly raise intra-abdominal pressure, such as chronic cough, constipation, vomiting, and sneezing [4, 20]. From a preventive standpoint, evidence summaries emphasise maintaining the strength of the abdominal-wall muscles around the stoma and avoiding sustained or excessive rises in intra-abdominal pressure, for instance by limiting heavy lifting—often expressed as avoiding loads greater than approximately 4.5 kg—in the early postoperative period [20]. The contribution of individual factors is, however, debated; obesity, frequently cited as a risk factor, was not associated with parastomal bulging in at least one large register-based analysis, which counsels a degree of caution in attributing risk [18].

During exercise these general principles translate into specific loading of the stomal aperture. Movements that involve a forceful, breath-holding contraction of the abdominal wall—the Valsalva manoeuvre—produce abrupt increases in intra-abdominal pressure that are transmitted to the fascial ring and may, in principle, drive contents through the defect [10, 20]. Heavy resistance training, maximal lifting, and uncontrolled trunk flexion tend to concentrate such pressures, whereas effort that is paced and coordinated with exhalation may distribute them more evenly [10, 19]. The clinical diagnosis of parastomal hernia itself exploits this relationship, being performed while the patient carries out a Valsalva manoeuvre in the supine or upright position [20]. Conversely, it has been proposed that exercises which strengthen the core and improve the timing of abdominal and pelvic-floor activation may help to contain intra-abdominal pressure and so support the aperture, although robust evidence that physical activity prevents herniation is still lacking [12, 19]. Notably, some cross-sectional data point in a direction contrary to common fears, reporting higher rates of parastomal herniation among individuals who exercise less rather than more [3]. This tension—between activity as a potential stressor and as a potential protective stimulus—lies at the centre of recommendations for exercising with, or in order to prevent, a parastomal hernia [12, 19].

3.3. Metabolic specificity

The metabolic consequences of a stoma depend strongly on its level along the gastrointestinal tract. Formation of an ileostomy removes the colon from the path of intestinal effluent and, with it, much of the body's capacity to reabsorb water and sodium, so that fluid and electrolyte losses are inherently greater than with a colostomy, whose effluent is more formed and lower in volume [2, 4]. An established ileostomy typically produces on the order of 600–1200 mL of effluent per day, and this effluent is comparatively rich in sodium, with a concentration of roughly 100 mmol/L [21]. Even under ordinary circumstances, therefore, the person with an ileostomy operates with a narrower margin of fluid and sodium reserve than someone with an intact colon [2, 21].

When output becomes excessive—commonly defined as exceeding approximately 1.5–2.0 L per day—a high-output stoma results, leading to depletion of water, sodium, and frequently magnesium [21]. The underlying physiology is instructive. Around four litres of endogenous secretions enter the upper jejunum each day, and because the jejunal mucosa is highly permeable and absorbs sodium only against a small gradient, coupled to the absorption of glucose, sodium and water may flow net into the lumen unless the luminal sodium concentration approaches about 90 mmol/L [22]. This helps to explain why oral hypotonic fluids can paradoxically increase losses, and why glucose–saline solutions with a sodium concentration of roughly 90–120 mmol/L are generally preferred for rehydration [21, 22].

The clinical stakes of these losses are considerable. Dehydration is among the most common reasons for readmission after ileostomy formation, with reported rates reaching around 17% in some series, and recurrent or subclinical volume depletion has been linked to acute kidney injury and to the later development of chronic kidney disease [4, 23]. One cohort reported that roughly a quarter of patients with an ileostomy developed chronic kidney disease within two years, and the risk of new or worsening chronic kidney disease has been estimated at approximately double that of comparable patients who underwent resection without an ileostomy [23, 24]. Subclinical sodium depletion, moreover, may be present in a substantial minority—by one estimate up to around 45%—of people with an ileostomy even in the absence of overt high output [24]. Adequate urine output, generally targeted at no less than about 1200 mL per day, serves as a practical bedside marker of hydration in this population [23].

These vulnerabilities acquire particular relevance in the context of sport. Intense or prolonged exertion, especially in warm environments, increases insensible and sweat-related losses of water and sodium, which are superimposed on the obligatory losses of an ileostomy and may tip a susceptible patient toward dehydration and prerenal kidney injury [3, 24]. A small case series of people with an ileostomy who completed a marathon is illustrative: although total water and potassium losses during the race were modest, the runners showed lower plasma sodium and rises in blood urea, uric acid, and bilirubin compared with non-ostomised controls, and a tendency to slight sodium depletion was noted [3]. On this basis it has been suggested that individuals with an ileostomy may be well advised to take glucose–electrolyte solutions when competing, particularly in hot conditions or when preparing for endurance events [3]. The practical implication—elaborated in Section 7—is that fluid and electrolyte planning forms an integral part of safe exercise for this group, in a way that is far less critical for patients with a colostomy [3, 21].

4. Barriers to undertaking physical activity

Although a stoma is rarely a true contraindication to exercise, people living with one are, on the whole, considerably less active than the general population, and a recurring observation is that a marked decline in physical activity follows stoma formation [3, 10]. In a United Kingdom survey of 425 people with a stoma, around 56% reported having decreased their physical activity since surgery, and roughly 30% had not undertaken any session of at least 30 minutes in the preceding week [25]. The obstacles underlying this pattern are conventionally grouped into physical and psychological–psychiatric domains, although in practice they interact closely [10, 16].

4.1. Physical barriers

Postoperative pain and the more general discomfort of recovery are among the most immediate deterrents to movement. In a cross-sectional study of activity levels and barriers, pain experienced during exercise was associated with the lowest exercise self-efficacy, and physical exertion, fatigue, and accessibility were perceived as the greatest barriers to activity [16]. Fatigue is particularly salient because, for many patients, the stoma is only one element of a wider illness trajectory; tiredness related to the underlying disease and to its treatment—most notably the cancer-related fatigue that frequently accompanies oncological therapy—compounds the deconditioning of surgery [3, 8]. Reduced physical fitness, including deficits in lower-limb strength, endurance, and flexibility, has been documented in colon cancer survivors with a stoma, which may render a given activity subjectively harder and less appealing [8].

Local, appliance-related concerns form a second cluster of physical barriers. Peristomal skin complications—erosion, irritation, and dermatitis arising chiefly from effluent leakage and from repeated adhesive removal—are common, occurring in a substantial proportion of patients, and are more frequent with ileostomy [2, 4]. The prospect of perspiration loosening the baseplate, or of the appliance detaching during vigorous movement, is a realistic worry that can discourage participation [4, 17]. In qualitative work accompanying a physical-activity intervention, the stoma-related themes that patients raised, and that the intervention sought to address, included fear of hernia, bending down, fatigue, pain, prolapse, surgical wounds, the stoma appliance itself, and stigma—an illustration of how physical and psychological concerns are intertwined [17]. Fear of developing or worsening a parastomal hernia, in particular, repeatedly emerges as a major deterrent to exercise, and is reinforced where the advice patients receive is restrictive or contradictory [10, 25]. The frequency with which such advice is absent is itself notable: a large proportion of survey respondents reported having received no guidance on physical activity, while the great majority of those would have welcomed it [25].

4.2. Psychological and psychiatric barriers

Body-image disturbance

The creation of a stoma alters both the appearance and the function of the body, and disturbance of body image is among the most consistently reported psychological consequences [15]. In a descriptive study using a body-image disturbance questionnaire, poorer adaptation to the altered body image was associated with younger age, being overweight, having a temporary stoma, and the presence of stoma complications, and it correlated negatively with self-efficacy for stoma care [26]. The relevance to sport is twofold: body-image concerns may inhibit participation in settings where the body is exposed or evaluated—reflected in the moderate physique anxiety observed among people with a stoma—and they tend to be more pronounced in younger individuals, who might otherwise be the most inclined toward athletic activity [16, 26]. Body-image disturbance also appears closely linked with mood, with higher disturbance reported among those experiencing depressive and anxiety symptoms [26].

Fear of social and hygienic embarrassment

A distinct and powerful barrier is the fear of a public failure of containment—leakage of intestinal contents, audible bowel sounds, ballooning of the pouch, or odour [3, 15]. These anxieties are not merely hypothetical: in one multicentre sample, a large majority of patients reported episodes of stool leakage and associated odour, and in survey data the feeling of becoming anxious when the pouch is full was among the most commonly cited detriments to quality of life [16, 27]. Such experiences feed a sense of shame and stigma; severe stigma has been reported in a substantial minority of people with a permanent colostomy, and stigma appears to exert a negative influence on psychosocial adaptation, an effect that may be mediated by the degree to which the individual comes to accept the change [27]. In the context of exercise, uncertainty in unfamiliar environments—changing rooms, communal showers, gyms, and competitive venues—together with shyness about the stoma being noticed, has been identified as a discouraging factor [3]. The combined effect is a tendency toward avoidance, in which the social risk of an exercise setting is weighed more heavily than its health benefits [3, 4].

Depressive and adjustment symptoms and reduced motivation

Beyond discrete fears, the broader burden of mood and adjustment disorders bears directly on the motivation to be active. Pooled estimates suggest that depressive symptoms are present in a large share of patients after stoma surgery—on the order of 40% or more—which is higher than in the general population, although validated measures indicate that these symptoms are, in many cases, below the threshold for major depressive disorder [13, 28]. Depression, anxiety, grief, and a provisional loss of self-esteem are recognised features of the early postoperative period, and they may impair not only the desire to exercise but also the assimilation of advice and the confidence required to act on it [29]. Adjustment to a stoma is a process rather than an event, and psychological support—including timely counselling—has been described as capable of improving self-concept and self-esteem during this period [29]. Crucially, low mood and low activity tend to co-occur: in a latent-profile analysis of more than 1,400 people with a stoma, the subgroup with the poorest quality of life was characterised by a higher prevalence of parastomal herniation and by spending fewer days physically active than the other profiles [30].

Because such data are cross-sectional, the direction of the relationship cannot be established—reduced activity may deepen low mood, just as low mood may curtail activity—but the association underscores that psychological and behavioural barriers reinforce one another [15, 30]. This bidirectionality also points toward the converse possibility, namely that appropriately supported activity might help to interrupt the cycle, a prospect examined in the following section [29, 30].

5. The impact of sport on the functioning of the patient with a stoma

Notwithstanding the barriers outlined above, a growing—if still modest—body of evidence indicates that appropriately tailored physical activity may benefit people with a stoma across both somatic and psychological domains [3]. It is important, however, to frame these benefits cautiously. Much of the supporting data is observational, and although the return to activity has been associated with gains in aerobic fitness, cancer-related fatigue, and several aspects of health-related quality of life, harder clinical endpoints—such as the number of complications, the incidence of parastomal hernia, or the length of hospital stay—have not yet been shown to improve as a direct consequence [3].

5.1. Somatic benefits

A first potential benefit concerns gastrointestinal function. Physical activity, and in particular early postoperative mobilisation, appears to support the recovery and maintenance of bowel motility; within enhanced recovery after surgery (ERAS) pathways, early mobilisation has been associated with a faster return of bowel function and a reduced incidence of postoperative complications [31]. This is of some relevance to the person with a stoma, given that ileus and bowel obstruction are recognised stoma-related complications [2, 4, 5]. More broadly, regular activity is a foundational component of general health, and remaining active is encouraged for people living with chronic conditions, of whom stoma patients are an example [7].

A second benefit relates to the abdominal wall itself. Where exercises are well selected and appropriately graded, core-focused training may strengthen the abdominal musculature and, in principle, improve dynamic support of the stomal aperture [10, 18]. Electromyographic work has identified exercises—particularly isometric movements with an adjustable load—that reliably engage the oblique and deep abdominal muscles from roughly two weeks after surgery onward, and best-practice recommendations position such graded core and pelvic-floor work as appropriate for most patients [10, 18]. The rationale, advanced in the context of Pilates-based interventions, is that improved abdominal strength and breathing control may help to regulate intra-abdominal pressure [19]. This potential benefit must, however, be stated with restraint: although maintaining abdominal-wall muscle strength is emphasised in preventive evidence summaries, robust proof that such exercise reduces the incidence of parastomal herniation is still lacking [12, 19, 20].

A third group of benefits centres on metabolic and anthropometric control. Regular physical activity contributes to glycaemic regulation and to the management of body weight, and is associated with a lower incidence of type 2 diabetes and with favourable changes in adiposity in the general population [7]. In stoma-relevant populations, lifestyle and workplace physical-activity interventions have been associated with reductions in body weight, body mass index, waist circumference, and blood glucose, although not all of these changes have reached statistical significance [3]. The relevance of weight control is twofold, because obesity is a recognised risk factor for several stoma complications—including parastomal hernia, prolapse, stomal necrosis, and peristomal skin problems—so that activity which assists weight management may also, indirectly, mitigate complication risk [4, 20]. As noted earlier, the strength of the obesity–herniation link is itself debated, and this dual benefit should therefore be regarded as plausible rather than established [18]. Even so, among cancer survivors with an ostomy, meeting physical-activity guidelines has been associated with better-reported physical strength and overall well-being [3].

5.2. Psychological benefits

The psychological benefits of activity may be at least as important as the somatic ones. Physical activity is widely held to exert positive effects on mental health, reducing stress and promoting psychological relaxation, and these effects appear to extend to people with a stoma [3]. A supervised case illustrates the point: a firefighter with rectal carcinoma and an ostomy who undertook an individualised, progressively structured training programme showed substantial reductions in distress and in both mental and physical fatigue over the course of the intervention [3]. Structured psychological and educational interventions delivered by nursing teams—for example, progressive muscle relaxation training combined with self-care education—have likewise been reported to reduce anxiety and to improve quality of life, underscoring the close coupling of physical and psychological recovery [29, 32].

Activity may also facilitate the resumption of valued social and occupational roles. The same firefighter case demonstrates a return to a physically demanding occupation after individualised, supervised rehabilitation, and the broader conception of rehabilitation is precisely the restoration of the individual to the lifestyle and roles held before illness, on the understanding that an ostomy is not, in itself, a handicapping procedure [3, 9]. Group- and team-based activity carries an additional social dimension, providing contact and a sense of normalcy that may counter the social withdrawal sometimes seen after stoma formation [3]. Nursing interventions that address social well-being alongside self-care have been associated with improvements in the social and psychological domains of quality of life [32].

Finally, the cumulative effect of these somatic and psychological gains appears to register at the level of overall quality of life. Across several cross-sectional studies, meeting or exceeding physical-activity guidelines has been associated with higher quality of life and greater psychological well-being among rectal and colorectal cancer survivors with an ostomy, and small increases in exercise from before to after surgery have correlated positively with quality of life [3]. A feasibility study of a tailored physical-activity intervention reported improvements across quality-of-life scales and in disease-specific fatigue, and nursing interventions combining self-care and psychological support have been shown to enhance quality of life [17, 32]. The converse association reinforces the point, in that the subgroup of patients reporting the poorest quality of life tends also to be the least physically active [30]. These relationships are, once again, largely correlational, and the possibility that better-adjusted patients are simply more inclined to exercise cannot be excluded; nevertheless, the consistency of the association lends qualified support to the view that activity is a worthwhile component of rehabilitation rather than a hazard to be avoided [3, 30].

6. Recommendations and limitations in specific sport disciplines

6.1. Phases of return to activity: the timeline from the first postoperative days to full loading

Two broad philosophies can be discerned in the literature on how, and how quickly, activity should be resumed. A more conservative tradition tends to specify fixed restrictions—for example, advising patients to avoid overloading the abdominal muscles for roughly six months, to refrain from heavy physical work or lifting during that period, and, in some accounts, to avoid contact sports because of the risk of abdominal injury [33]. Allied evidence summaries similarly suggest commencing abdominal muscle exercise within the first three months and continuing it for at least a year, while limiting early lifting to loads below approximately 4.5 kg [20]. A more recent, enabling approach—exemplified by the first dedicated best-practice recommendations in this area—deliberately moves away from rigid timeframes in favour of an individualised pathway, on the argument that exercise is safe and essential and that blanket restrictions and overly cautious language may themselves cause harm by fostering fear avoidance [10]. These positions are not wholly irreconcilable, but their coexistence reflects the absence, at present, of an agreed consensus [10].

In the earliest phase—the first postoperative days—both traditions converge on the value of gentle, early mobilisation. Within enhanced recovery pathways, getting out of bed within roughly the first 24 hours, walking, climbing stairs, repeated sit-to-stand transfers, and calf raises are encouraged to limit muscle loss and to reduce thromboembolic and respiratory complications [10, 31]. In hospital-based rehabilitation, this is complemented by breathing and expectoration exercises, wound stabilisation during coughing or position change, antithrombotic foot and ankle movements, and early verticalisation, typically one to two days after surgery [33]. General mobilising exercises of the limbs are favoured at this stage in preference to direct abdominal loading—because of the risk of wound dehiscence—yet the small, synergistic abdominal contraction they produce is itself considered helpful in restoring intestinal peristalsis and local circulation [33]. Gentle core work, such as pelvic tilts and knee rolls, may be introduced from around three to four days after surgery, in line with stoma-nursing recommendations and with electromyographic evidence that such movements are tolerable, even if substantial abdominal muscle activation is not reliably achieved in the very first two weeks [10, 18].

Beyond this initial phase, progression toward full loading is best conceived as a graded, individualised continuum rather than a fixed schedule. Core rehabilitation advances through ascending levels of difficulty over weeks to months, after which return to daily activities and then to sport is layered on according to the demands of the chosen activity and the complexity of the surgery [10]. Repetitive high-impact activities—running and jumping—and heavier lifting are commonly deferred, particularly after complex pelvic surgery such as abdominoperineal resection, where a delay of roughly three to six months is advised to allow full healing and to reduce the risk of perineal herniation; for the most deconditioned patients or those with the most extensive surgery, return to a pre-surgery level may realistically take one to two years or more [10]. Importantly, contemporary recommendations argue against arbitrary lifting limits and fixed rest periods, holding that *how* a person lifts and loads—using breathing and abdominal engagement to manage intra-abdominal pressure—matters more than a notional timeline since surgery [10]. The more cautious sources, by contrast, retain a generalised period of abdominal protection of around six months [20, 33]. In either framing, the unifying principle is that the timeline is personal and that progression should be guided by the individual's symptoms and tolerance [10].

6.2. Aerobic training

Aerobic activity provides much of the foundation of a return to fitness, and walking is almost universally the first modality, valued for its low load on the abdominal wall and its psychological benefit of demonstrable progress [10]. From this base, progression toward a jog–walk programme, running, cycling, and swimming is generally regarded as appropriate, and these very modalities—walking, running, swimming, and cycling—are the canonical examples of endurance activity in general physical-activity guidance [7, 10]. The case literature reflects this in practice, describing people with a stoma who resumed running, swimming, rowing, and cycling, and even completed endurance events such as a marathon [3].

Cycling warrants a specific consideration regarding the saddle and seated position. For individuals who have undergone rectal or pelvic-floor surgery, sustained pressure on the perineal or rectal area can be problematic, and activities that load this region may require modification—for example, cushioning, an adjusted or pressure-relieving saddle, or a change of position [10]. Attention to saddle selection and seating is therefore a reasonable, individualised precaution in this subgroup, rather than a contraindication to cycling as such [10].

Swimming, frequently a source of anxiety because of the aquatic environment, is in fact subject to few specific restrictions. The principal caveat is that all wounds should be fully healed before returning to the water, owing to the risk of infection; beyond this, no particular restriction on swimming is advised [10]. Modern appliances are designed to remain adherent and secure during immersion, and where individuals wish to use supportive or specialised swimwear—or simply higher-waisted garments—for added comfort and confidence, this is best framed as a matter of personal choice rather than a clinical requirement [10].

6.3. Strength and resistance training

Resistance training should not be discouraged. Muscle-strengthening activity on two or more days per week is a general health recommendation, and people with a stoma—including those who have developed a parastomal hernia—are encouraged to meet it, since avoidance may itself foster fear and undermine health [7, 10]. The foundation of safe strength work is, however, competent core function: restoring the timing and coordination of the deep abdominal muscles, with particular emphasis on the transversus abdominis acting in cocontraction with the pelvic floor, is regarded as a prerequisite before and alongside heavier loading [10, 18]. Exercises that allow controlled, adjustable effort—isometric movements such as a diagonal isometric press or a ball squeeze—reliably engage these muscles and are well tolerated, which makes them useful early building blocks [18].

When weights are introduced, several principles recur. It is generally advised to begin with lighter loads and higher repetitions (on the order of 12–15 repetitions), to keep the weight close to the centre of the body, and to favour shorter-lever, more isolated movements—such as biceps curls or shoulder presses—before progressing to compound lifts like squats and deadlifts, which demand greater core stability and generate higher intra-abdominal pressure [10]. For an experienced individual returning after surgery, restarting at around half of the pre-operative load, repetitions, and sets offers a cautious reference point from which to rebuild [10]. Throughout, good technique and gradual progression take precedence over the absolute weight lifted [10].

Breathing technique is the element that most directly governs the safety of these efforts. The central instruction is to avoid the Valsalva manoeuvre—that is, breath-holding or bracing against a closed glottis—and instead to exhale at the point of effort or exertion, engaging the abdominal and pelvic-floor muscles so as to regulate rather than spike intra-abdominal pressure [10]. Mechanically, this entails expanding the ribs and abdomen on inhalation and contracting them on exhalation through the oblique and deep abdominal muscles, while avoiding overuse of the upper abdominals, a pattern consistent with the proposed protective role of breathing-based pressure management [10, 19]. Self-monitoring complements technique: warning signs such as visible doming or bulging at the stoma on exertion, a sensation of pressure or pulling around the stoma, or prolapse during effort indicate that an exercise should be modified or regressed [10]. Used together, graded core training and disciplined breathing form the basis of the cautious optimism with which strength training is now generally regarded in this population [10, 18].

6.4. Contact and extreme sports

The most physically demanding category of activity—encompassing football, rugby, competitive or contact martial arts, skiing and snowboarding, water-skiing, windsurfing, and diving—poses the dual challenge of high intra-abdominal pressure and the possibility of direct impact to the stoma [10]. Here, too, the literature is divided. The more cautious view holds that contact sports are best avoided because of the risk of abdominal injury [33]. The enabling view, by contrast, maintains that most activities and sports are possible with a stoma—including highly demanding and contact disciplines—and that no sport is absolutely contraindicated once appropriate, often lengthy, sport-specific rehabilitation has been completed; on this account the stoma is generally resilient to knocks and impact [10]. Fear of injury is, in any case, a recognised psychological barrier that may exceed the objective risk [3].

Where impact is foreseeable, protective measures may be used both to safeguard the appliance and to increase confidence, but their selection requires care. Contrary to the intuitive assumption that a rigid shield offers the best protection, hard, plastic, dome-shaped stoma guards are generally not recommended, because in a high-impact collision or fall they may concentrate force and damage the abdominal wall; flatter protection, padding, or foam is considered more suitable, and individuals are encouraged to explore commercial or improvised options accordingly [10]. The reasonable synthesis of these positions is that participation in contact and extreme sport is a matter for individualised judgement—weighing the demands of the discipline, the completeness of rehabilitation, and the person's own goals—rather than for a blanket prohibition or an unqualified endorsement [3, 10, 33].

7. Prevention of complications and practical preparation for exercise

7.1. Equipment and orthopaedic–medical provision

Among the most frequently discussed adjuncts to physical activity are stoma support belts and garments. Their proposed roles are several: to support the abdominal wall during exercise or "risky" activities involving lifting, to reduce a dragging sensation and the discomfort of an existing hernia, to conceal the appliance, and—in some designs—to muffle sounds, thereby addressing both biomechanical and psychosocial concerns [12]. The available options span a spectrum, from rigid postoperative abdominal binders, through dedicated hernia support belts with or without an opening for the appliance, to lighter ostomy support belts and everyday support underwear such as control-top garments, high-waisted elasticated shorts, and shapewear [12]. Selection is necessarily individual: it should take account of the person's lifestyle, body type, stoma type and function, the pouching system in use, comfort, cost, and personal preference, and best practice frames the decision as a collaborative one, recognising that not every individual will need or want a belt [12].

The central question, however, is whether these garments achieve more than subjective support. Here the evidence is notably thin. A health-technology review identified no studies that directly evaluated the clinical or cost-effectiveness of hernia support garments against alternative prevention or management strategies, or against no intervention; the three guidelines it located confined themselves to recommending parastomal-hernia risk assessment and patient education about such garments rather than asserting that they prevent herniation [34]. Consistent with this, contemporary recommendations caution against routine prophylactic support wear in people with newly formed stomas, on the grounds of cost, potential unintended harm, and unnecessary medicalisation, and they place greater emphasis on building core muscle strength than on reliance on a garment [10]. There is even a suggestion that habitual, continuous belt use may, over time, weaken the abdominal muscles and thereby paradoxically favour herniation, which argues for periodic rather than constant use [33]. Where a garment is used to support effort, evidence summaries advise wearing it during activities that raise intra-abdominal pressure rather than at all times, and attending to correct fitting [20]. The design itself carries trade-offs: a garment with too large an opening may permit the stoma to prolapse or the skin to bulge through, whereas a garment without an opening may hold effluent against the baseplate, impede the release of gas, and complicate emptying [12]. The reasonable synthesis is that support garments may offer genuine comfort, confidence, and biomechanical reassurance during exercise, but that their capacity to reduce parastomal-hernia risk objectively remains unproven, and they should complement rather than replace core rehabilitation [10, 12, 34].

Compression and supportive underwear occupy a related, lower-intensity niche. Control-top underwear, high-waisted Lycra shorts or leggings, shapewear, and belly bands can provide light-to-moderate support, are comfortable and comparatively inexpensive, assist with body image and concealment, and may be particularly useful as a person becomes more active in daily life [12]. The caveat is that overly tight or restrictive clothing can impede movement and, importantly, breathing—which is central to intra-abdominal pressure management during exercise—so such garments are best regarded as an optional aid chosen for comfort rather than a mandated intervention [10]. Cost and unequal access to specialist fitting are recurring practical barriers that may limit the real-world usefulness of all of these products [12, 34].

7.2. Care and preparation of the pouch

Sound appliance management is the practical foundation of confident exercise. A straightforward and widely applicable measure is to empty the pouch before activity: extending the standard guidance to empty an appliance when it is around one-third full, exercising with a recently emptied, less bulky pouch reduces its weight and the leverage it exerts on the seal, and may lessen both the risk of detachment and the wearer's anxiety [9]. Indeed, finding a reliable pouching system has been described as integral to recovery and to regaining the confidence to resume sport [3]. The choice between one- and two-piece systems, and the security of the seal, are therefore not trivial details but determinants of whether a person feels able to be active [3, 9].

Protecting the peristomal skin and reinforcing the seal are equally important, because the perspiration and movement of exercise can challenge adhesion and predispose to the skin complications that are themselves a barrier to activity. A range of accessories is used to this end: skin-barrier paste to fill irregularities, hydrocolloid barrier rings or seals, protective strips and powders, and convex appliances that flatten the peristomal contours and improve adhesion in flush or retracted stomas [4, 9]. Careful shaping and close fixation of the baseplate, with paste where required, help to prevent the chemical irritation caused by effluent, which is most aggressive in ileostomates [2]. These appliance-based measures sit within the broader set of nursing interventions used to manage a stoma and its complications, including a parastomal bulge [14]. Finally, the management of gas and odour—through appliance features designed to vent and deodorise, and through the dietary measures discussed below—is relevant to exercising in company, although it should be noted that a support garment without an opening may itself impede gas release [1, 2, 12].

7.3. Dietary interventions and hydration

For the person with an ileostomy in particular, fluid and electrolyte planning is arguably the single most important practical preparation for exertion. Because the effluent is rich in sodium and the colon is no longer available to reclaim water, the losses of exercise—through sweat and increased respiration—are superimposed on already elevated baseline losses [3, 21]. The counter-intuitive consequence is that drinking large volumes of plain, hypotonic fluid such as water may worsen rather than relieve dehydration, by drawing further sodium and water into the bowel, whereas glucose–saline solutions or oral rehydration solutions with a sodium concentration of roughly 90–120 mmol/L enhance absorption and are generally preferred [21, 22, 23]. Hypertonic, sugary drinks are best avoided for the same reason, as they tend to increase output [23]. A pragmatic strategy is therefore to ensure adequate sodium-containing hydration before activity, to sip an oral rehydration solution during prolonged effort, and to replace losses afterwards, using urine output—targeted at no less than about 1200 mL per day—as a simple marker of adequacy, with attention also to magnesium where indicated [21, 23, 24]. The relevance of this regimen is illustrated by ileostomate marathon runners, for whom glucose–electrolyte solutions have been recommended when competing, particularly in hot conditions, and it is far less critical for people with a colostomy, whose fluid economy is largely preserved [3, 21].

Dietary modification also has a role in moderating output and in reducing the gas and odour that can heighten social anxiety during exercise. Diets relatively low in sugar and sugar alcohols may help to reduce high ileostomy output, while fibre may thicken effluent—although it can also bind nutrients and water and is not a hydrating measure [23]. Certain foods, such as eggs and fish, are associated with a more unpleasant odour, and individuals can learn through experience which items provoke excessive gas, adjusting the timing of meals around training accordingly [2]. Structured education on diet—alongside ostomy self-care and physical activity—has been incorporated into nursing programmes shown to improve quality of life, underscoring that nutritional advice is a legitimate component of rehabilitation rather than an afterthought [32]. This matters because the gap between what patients want and what they receive is wide: in survey data, a substantial proportion reported having been given no dietary advice, and the great majority of those would have welcomed it [25]. The absence, at present, of standardised oral-rehydration protocols for this population further underscores the need for individualised, expert dietetic input, a theme that connects directly to the interdisciplinary care considered next [24].

8. The role of interdisciplinary care

A consistent thread running through the literature on activity after stoma surgery is that no single professional can meet all of a patient's needs, and that good outcomes depend on coordinated, multidisciplinary care [35]. Discharge planning and rehabilitation are best understood as ongoing processes that begin soon after admission, are preceded by a holistic assessment, and require the specialist practitioner to refer on to other professionals where appropriate, while keeping the patient and their carers involved in every decision [35]. Hospital-based rehabilitation accounts of stoma care reach the same conclusion, identifying the therapeutic team as comprising, at minimum, the physician, nurse, physiotherapist, psychologist, and dietitian [33]. For the specific question of returning to exercise and sport, contemporary best-practice recommendations make the multidisciplinary team an explicit recommendation in its own right, precisely because expertise in exercise and physical activity is unevenly distributed across the professions that a person with a stoma will encounter [10].

The composition of the team

The **attending physician**—usually the colorectal surgeon, sometimes the gastroenterologist—sets the surgical and medical frame within which activity is later resumed. Decisions taken before and during surgery, such as preoperative stoma siting and marking, have a measurable bearing on later complication rates and on the quality of the appliance seal, which in turn conditions confidence in exercise [2, 4]. The surgeon also remains the point of reference for the management of complications and for judgements about high-risk surgery, and features within the recommended team alongside anaesthetists and enhanced-recovery staff [9, 10].

The **stoma care nurse**—variously titled the wound, ostomy and continence nurse or enterostomal therapist—is in most accounts the linchpin of the team. Such nurses provide preoperative counselling and marking, postoperative education in appliance management, psychological support, and structured follow-up, and their involvement is associated with fewer complications and better quality of life [2, 4, 9]. They coordinate communication between the other team members, undertake parastomal-hernia risk assessment, and advise on, or fit, support garments, and they are the professionals who most often manage a parastomal bulge non-surgically [12, 14, 35]. Nursing interventions that combine self-care education with psychological support have themselves been shown to improve quality of life, which reinforces the centrality of this role [32].

The **physiotherapist** carries primary responsibility for the physical rehabilitation that underpins a return to activity. In the early phase this encompasses breathing exercises, mobilisation, and thromboprophylactic movement; thereafter it extends to core and pelvic-floor rehabilitation and to graded exercise prescription [31, 33]. Recommendations place particular weight on access to a physiotherapist with pelvic-health or clinical-Pilates expertise—an essentially urogynaecological and clinical specialisation—especially after complex pelvic surgery such as abdominoperineal resection, where pelvic-floor dysfunction may complicate the return to high-impact activity [10]. Collaboration between the stoma nurse and the physiotherapist is repeatedly identified as a means of supporting a safe and gradual return to an active lifestyle [12].

Finally, the **psychological and dietetic** dimensions warrant dedicated expertise. Given that depressive symptoms affect a large share of patients after stoma surgery and that body-image disturbance, stigma, and fear avoidance can all curtail activity, access to psychological care—and, where indicated, to a psychotherapist or psychiatrist—is an appropriate component of the pathway, and structured psychosocial and psychosexual support, such as that organised around the PLISSIT framework, has a recognised place [13, 28, 29]. In parallel, the dietitian addresses the nutritional and, for ileostomates especially, the fluid and electrolyte planning that safe exercise demands [33, 35]. The illustrative value of a coordinated approach is evident in case-based accounts, in which the stoma nurse facilitates communication between dietitian and physiotherapist so that, for example, a rehabilitation regimen takes proper account of a malnourished patient's weakened state [35].

Consistency of advice and patient education

A recurring problem—and a strong argument for genuine integration rather than parallel working—is the inconsistency of the advice patients receive. Guidance on exercise after stoma surgery is frequently described as contradictory and confusing, and a cohesive, consistent message across the whole team is therefore treated as a priority, to the point that recommendations suggest nominating a key individual to coordinate dissemination and ensure that all professionals signpost to the same information [10]. The practical machinery of coordination—the discharge coordinator, the multidisciplinary discharge meeting, the involvement of community services—serves the same end of a seamless transition from hospital to home [35].

Within this framework, patient education emerges as perhaps the single most important determinant of a successful return to activity. The early promotion of self-care and the acquisition of stoma-management skills have been described as among the strongest predictors of positive adjustment, and are most effectively taught in small, repeated steps at the patient's own pace [35]. Yet the gap between need and provision is striking: surveys indicate that a large proportion of people with a stoma receive no advice about physical activity or diet, while the overwhelming majority of those would have welcomed it, and patients frequently do not recall being given any guidance about exercise [16, 25]. The same desire for direction is evident specifically in relation to abdominal exercises, which patients report wanting help to perform [18]. Education is not merely informational but motivational; the use of strengths-based, empowering language—focusing on what an individual can do rather than what they must avoid—is itself regarded as capable of improving engagement with physical activity, whereas overly cautious language can foster the fear avoidance that drives inactivity [10]. Educational interventions, including written and verbal instruction on core and abdominal exercise, are accordingly recommended for all individuals at risk of, or living with, a parastomal hernia, and structured patient education has been associated with improvements in quality of life [2, 12, 32]. Because psychological difficulties may emerge up to a year after surgery, and because living with a stoma is a long-term state, such education and support are best conceived as continuing for as long as the person has the stoma, rather than ending at discharge [9, 35]. In sum, interdisciplinary care and patient education are not separable: the team's value is realised largely through the consistent, individualised, and empowering education it provides, which is what ultimately enables a safe and confident return to sport [3, 10].

9. Summary and final conclusions

The body of evidence assembled in this review converges on a cautiously optimistic, but heavily qualified, conclusion: for the great majority of people who have undergone ostomy surgery, sport and physical activity appear to be feasible and potentially beneficial, yet they remain underused, inconsistently supported, and inadequately studied [3, 10]. The stoma is, in an often-repeated formulation, the outcome of treatment rather than the condition itself, and it is seldom a genuine contraindication to exercise [10]. Despite this, the recurring empirical observation is one of widespread inactivity—most people with a stoma do not meet general physical-activity recommendations—accompanied by measurable declines in physical fitness and by a reduction in activity that frequently follows surgery [8, 16, 25].

Three domains shape *how*, rather than *whether*, activity should be resumed. Anatomically, the breach of the abdominal wall and the persistent fascial defect underlie the risk of parastomal herniation, a common late complication whose mechanism is bound up with the management of intra-abdominal pressure; the prudent response appears to be graded core and breathing training and the avoidance of uncontrolled pressure spikes—chiefly the Valsalva manoeuvre—rather than the blanket avoidance of effort [4, 18, 20]. Metabolically, the person with an ileostomy is distinctively vulnerable to fluid and sodium depletion, which intense or prolonged exertion in the heat may compound, so that glucose–saline rehydration and attention to urine output become integral to safe participation; the same considerations are largely immaterial for a colostomy [3, 21, 23]. These physiological realities explain why the most defensible stance is individualisation: the demands of the activity, the complexity of the surgery, and the person's own trajectory matter more than any fixed timeline [10, 12].

Set against the barriers—postoperative pain and fatigue, peristomal skin problems and the fear of appliance detachment, and, in the psychological sphere, disturbed body image, fear of leakage and stigma, and a high background prevalence of depressive and adjustment symptoms—are benefits that, although demonstrated mostly through observational and small interventional studies, are reasonably consistent [16, 17, 25, 26, 27, 28]. Appropriately tailored activity has been associated with better quality of life, reduced fatigue, improved mood and self-esteem, the resumption of social and occupational roles, and gains relevant to weight and glycaemic control, the last of which may bear indirectly on complication risk [3, 30, 31, 32]. The tension between a conservative tradition that counsels caution and avoidance, and a contemporary, enabling philosophy that regards exercise as safe and essential, runs throughout the literature and is, at present, unresolved [10, 33].

Translating this into practice depends on coordinated interdisciplinary care and, above all, on education. The advice patients receive is too often contradictory or absent, and a cohesive multidisciplinary approach—surgeon, stoma care nurse, pelvic-health physiotherapist, and psychological and dietetic support—together with consistent, empowering, individualised education, is repeatedly identified as the means of closing this gap [10, 35]. Practical preparations such as emptying and securing the appliance, protecting the peristomal skin, and—most importantly for ileostomates—planning hydration and electrolytes are well grounded, whereas the popular reliance on support garments to prevent herniation is not, with the available evidence indicating comfort and confidence but no proven reduction in objective risk [12, 24, 34].

The principal limitation of this field is the weakness of its evidence base. There is, at present, a conspicuous absence of large randomised controlled trials evaluating specific training protocols—their type, frequency, intensity, and progression—in people with a stoma, and the recommendations that do exist rest substantially on expert opinion and clinical experience rather than on high-level evidence [3, 10]. Several specific uncertainties follow from this. It remains unproven whether exercise, and core training in particular, actually prevents or mitigates parastomal herniation, despite a plausible mechanistic rationale [12, 18, 19]. Hard clinical endpoints—

complication rates, hernia incidence, and length of hospital stay—have not been shown to improve as a consequence of activity, even where quality-of-life and fitness outcomes appear to do so [3]. The literature is dominated by adults and by oncological populations, leaving children and non-oncological patients comparatively unstudied, and it is further constrained by heterogeneous designs, small samples, and a shortage of valid, condition-specific outcome measures [3]. Standardised oral-rehydration protocols for this population are lacking, and the harms of abdominal exercise after stoma surgery, together with the optimal timing and progression of such exercise, remain inadequately characterised [18, 24].

Future research should therefore prioritise adequately powered, longitudinal, and randomised studies of defined exercise interventions, with attention to safety and harms as well as to benefits, to the full spectrum of stoma types and indications, and to psychological, social, and metabolic outcomes alongside the physical [3, 18]. Until such evidence accrues, the most reasonable position—and the one toward which the current literature inclines—is that sport after ostomy surgery should be neither discouraged by default nor endorsed without qualification, but enabled through individualised, graded, and well-supported rehabilitation, in which the operative question is not whether the patient may be active, but how they can be so safely and confidently [3, 10].

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