

Hip fracture

The management of hip fracture in adults

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NICE clinical guideline 124

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Introduction

Hip fracture refers to a fracture occurring in the area between the edge of the femoral head and 5 centimetres below the lesser trochanter (see figure 1 in the [full guideline](#)). These fractures are generally divided into two main groups. Those above the insertion of the capsule of the hip joint are termed intracapsular, subcapital or femoral neck fractures. Those below the insertion are extracapsular. The extracapsular group is split further into trochanteric (inter- or pertrochanteric and reverse oblique) and subtrochanteric.

Hip fracture is a major public health issue due to an ever increasing ageing population. About 70,000 to 75,000 hip fractures occur each year and the annual cost (including medical and social care) for all UK hip fracture cases is about £2 billion. About 10% of people with a hip fracture die within 1 month and about one-third within 12 months. Most of the deaths are due to associated conditions and not to the fracture itself, reflecting the high prevalence of comorbidity. Because the occurrence of fall and fracture often signals underlying ill health, a comprehensive multidisciplinary approach is required from presentation to subsequent follow-up, including the transition from hospital to community.

This guideline covers the management of hip fracture from admission to secondary care through to final return to the community and discharge from specific follow-up. It assumes that anyone clinically suspected of having a hip fracture will normally be referred for immediate hospital assessment. It excludes (other than by cross-reference) aspects covered by parallel NICE guidance, most notably primary and secondary prevention of fragility fractures, but recognises the importance of effective linkage to these closely related elements of comprehensive care. Although hip fracture is predominantly a phenomenon of later life (the [National Hip Fracture Database](#) reports the average age of a person with hip fracture as 84 years for men and 83 for women, it may occur at any age in people with osteoporosis or osteopenia, and this guidance is applicable to adults across the age spectrum. Management of hip fracture has improved through the research and reporting of key skills, especially by collaborative teams specialising in the care of older people (using the general designation 'orthogeriatrics'). These skills are applicable in hip fracture irrespective of age, and the guidance includes recommendations that cover the needs of younger patients by drawing on such skills in an organised manner.

Although not a structured service delivery evaluation, the Guideline Development Group was required to extend its remit to cover essential implications for service organisation within the NHS where these are fundamental to hip fracture management, and this has been done.

The guideline will assume that prescribers will use a drug's summary of product characteristics to inform decisions made with individual patients.

Patient-centred care

This guideline offers best practice advice on the care of patients with hip fracture.

Treatment and care should take into account patients' needs and preferences. People with hip fracture should have the opportunity to make informed decisions about their care and treatment, in partnership with their healthcare professionals. If patients do not have the capacity to make decisions, healthcare professionals should follow the [Department of Health's advice on consent](#) and the [code of practice that accompanies the Mental Capacity Act](#). In Wales, healthcare professionals should follow [advice on consent from the Welsh Government](#).

Good communication between healthcare professionals and patients is essential. It should be supported by evidence-based written information tailored to the patient's needs. Treatment and care, and the information patients are given about it, should be culturally appropriate. It should also be accessible to people with additional needs such as physical, sensory or learning disabilities, and to people who do not speak or read English.

If the patient agrees, families and carers should have the opportunity to be involved in decisions about treatment and care.

Families and carers should also be given the information and support they need.

Key priorities for implementation

Timing of surgery

- Perform surgery on the day of, or the day after, admission.
- Identify and treat correctable comorbidities immediately so that surgery is not delayed by:
 - anaemia
 - anticoagulation
 - volume depletion
 - electrolyte imbalance
 - uncontrolled diabetes
 - uncontrolled heart failure
 - correctable cardiac arrhythmia or ischaemia
 - acute chest infection
 - exacerbation of chronic chest conditions.

Planning the theatre team

- Schedule hip fracture surgery on a planned trauma list.

Surgical procedures

- Perform replacement arthroplasty (hemiarthroplasty or total hip replacement) in patients with a displaced intracapsular fracture.
- Offer total hip replacements to patients with a displaced intracapsular fracture who:
 - were able to walk independently out of doors with no more than the use of a stick **and**
 - are not cognitively impaired **and**
 - are medically fit for anaesthesia and the procedure.

-
- Use extramedullary implants such as a sliding hip screw in preference to an intramedullary nail in patients with trochanteric fractures above and including the lesser trochanter (AO classification types A1 and A2).

Mobilisation strategies

- Offer patients a physiotherapy assessment and, unless medically or surgically contraindicated, mobilisation on the day after surgery.
- Offer patients mobilisation at least once a day and ensure regular physiotherapy review.

Multidisciplinary management

- From admission, offer patients a formal, acute orthogeriatric or orthopaedic ward-based Hip Fracture Programme that includes all of the following:
 - orthogeriatric assessment
 - rapid optimisation of fitness for surgery
 - early identification of individual goals for multidisciplinary rehabilitation to recover mobility and independence, and to facilitate return to pre-fracture residence and long-term wellbeing
 - continued, coordinated, orthogeriatric and multidisciplinary review
 - liaison or integration with related services, particularly mental health, falls prevention, bone health, primary care and social services
 - clinical and service governance responsibility for all stages of the pathway of care and rehabilitation, including those delivered in the community.
- Consider early supported discharge as part of the Hip Fracture Programme, provided the Hip Fracture Programme multidisciplinary team remains involved, and the patient:
 - is medically stable **and**
 - has the mental ability to participate in continued rehabilitation **and**
 - is able to transfer and mobilise short distances **and**

- has not yet achieved their full rehabilitation potential, as discussed with the patient, carer and family.

1 Guidance

The following guidance is based on the best available evidence. The [full guideline](#) gives details of the methods and the evidence used to develop the guidance.

Some aspects of hip fracture management are already covered by NICE guidance and are therefore outside the scope of this guideline. In order to ensure comprehensive management and continuity, the following NICE guidance should be referred to when developing a complete programme of care for each patient: osteoporotic fragility fracture prevention (NICE technology appraisals guidance [204](#), [161](#) and [160](#)), [falls](#) (NICE clinical guideline 21), [pressure ulcers](#) (NICE clinical guideline 29), [nutrition support](#) (NICE clinical guideline 32), [dementia](#) (NICE clinical guideline 42), [surgical site infection](#) (NICE clinical guideline 74), [venous thromboembolism](#) (NICE clinical guideline 92) and [delirium](#) (NICE clinical guideline 103), all of which are listed in section 6 of this guideline.

1.1 Imaging options in occult hip fracture

- 1.1.1 Offer magnetic resonance imaging (MRI) if hip fracture is suspected despite negative X-rays of the hip of an adequate standard. If MRI is not available within 24 hours or is contraindicated, consider computed tomography (CT.).

1.2 Timing of surgery

- 1.2.1 Perform surgery on the day of, or the day after, admission.
- 1.2.2 Identify and treat correctable comorbidities immediately so that surgery is not delayed by:
- anaemia
 - anticoagulation
 - volume depletion
 - electrolyte imbalance
 - uncontrolled diabetes

- uncontrolled heart failure
- correctable cardiac arrhythmia or ischaemia
- acute chest infection
- exacerbation of chronic chest conditions.

1.3 Analgesia

1.3.1 Assess the patient's pain:

- immediately upon presentation at hospital **and**
- within 30 minutes of administering initial analgesia **and**
- hourly until settled on the ward **and**
- regularly as part of routine nursing observations throughout admission.

1.3.2 Offer immediate analgesia to patients presenting at hospital with suspected hip fracture, including people with cognitive impairment.

1.3.3 Ensure analgesia is sufficient to allow movements necessary for investigations (as indicated by the ability to tolerate passive external rotation of the leg), and for nursing care and rehabilitation.

1.3.4 Offer paracetamol every 6 hours preoperatively unless contraindicated.

1.3.5 Offer additional opioids if paracetamol alone does not provide sufficient preoperative pain relief.

1.3.6 Consider adding nerve blocks if paracetamol and opioids do not provide sufficient preoperative pain relief, or to limit opioid dosage. Nerve blocks should be administered by trained personnel. Do not use nerve blocks as a substitute for early surgery.

1.3.7 Offer paracetamol every 6 hours postoperatively unless contraindicated.

1.3.8 Offer additional opioids if paracetamol alone does not provide sufficient postoperative pain relief.

1.3.9 Non-steroidal anti-inflammatory drugs (NSAIDs) are not recommended.

1.4 Anaesthesia

1.4.1 Offer patients a choice of spinal or general anaesthesia after discussing the risks and benefits.

1.4.2 Consider intraoperative nerve blocks for all patients undergoing surgery.

1.5 Planning the theatre team

1.5.1 Schedule hip fracture surgery on a planned trauma list.

1.5.2 Consultants or senior staff should supervise trainee and junior members of the anaesthesia, surgical and theatre teams when they carry out hip fracture procedures.

1.6 Surgical procedures

1.6.1 Operate on patients with the aim to allow them to fully weight bear (without restriction) in the immediate postoperative period.

1.6.2 Perform replacement arthroplasty (hemiarthroplasty or total hip replacement) in patients with a displaced intracapsular fracture.

1.6.3 Offer total hip replacements to patients with a displaced intracapsular fracture who:

- were able to walk independently out of doors with no more than the use of a stick **and**
- are not cognitively impaired **and**

- are medically fit for anaesthesia and the procedure.
- 1.6.4 Use a proven femoral stem design rather than Austin Moore or Thompson stems for arthroplasties. Suitable designs include those with an Orthopaedic Data Evaluation Panel rating of 10A, 10B, 10C, 7A, 7B, 5A, 5B, 3A or 3B.
- 1.6.5 Use cemented implants in patients undergoing surgery with arthroplasty.
- 1.6.6 Consider an anterolateral approach in favour of a posterior approach when inserting a hemiarthroplasty.
- 1.6.7 Use extramedullary implants such as a sliding hip screw in preference to an intramedullary nail in patients with trochanteric fractures above and including the lesser trochanter (AO classification types A1 and A2).
- 1.6.8 Use an intramedullary nail to treat patients with a subtrochanteric fracture.

1.7 Mobilisation strategies

- 1.7.1 Offer patients a physiotherapy assessment and, unless medically or surgically contraindicated, mobilisation on the day after surgery.
- 1.7.2 Offer patients mobilisation at least once a day and ensure regular physiotherapy review.

1.8 Multidisciplinary management

- 1.8.1 From admission, offer patients a formal, acute, orthogeriatric or orthopaedic ward-based Hip Fracture Programme that includes all of the following:
- orthogeriatric assessment
 - rapid optimisation of fitness for surgery
 - early identification of individual goals for multidisciplinary rehabilitation to recover mobility and independence, and to facilitate return to pre-fracture residence and long-term wellbeing

- continued, coordinated, orthogeriatric and multidisciplinary review
- liaison or integration with related services, particularly mental health, falls prevention, bone health, primary care and social services
- clinical and service governance responsibility for all stages of the pathway of care and rehabilitation, including those delivered in the community.

1.8.2 If a hip fracture complicates or precipitates a terminal illness, the multidisciplinary team should still consider the role of surgery as part of a palliative care approach that:

- minimises pain and other symptoms **and**
- establishes patients' own priorities for rehabilitation **and**
- considers patients' wishes about their end-of-life care.

1.8.3 Healthcare professionals should deliver care that minimises the patient's risk of delirium and maximises their independence, by:

- actively looking for cognitive impairment when patients first present with hip fracture
- reassessing patients to identify delirium that may arise during their admission
- offering individualised care in line with 'Delirium' (NICE clinical guideline 103).

1.8.4 Consider early supported discharge as part of the Hip Fracture Programme, provided the Hip Fracture Programme multidisciplinary team remains involved, and the patient:

- is medically stable **and**
- has the mental ability to participate in continued rehabilitation **and**
- is able to transfer and mobilise short distances **and**
- has not yet achieved their full rehabilitation potential, as discussed with the patient, carer and family.

1.8.5 Only consider intermediate care (continued rehabilitation in a community hospital or residential care unit) if all of the following criteria are met:

- intermediate care is included in the Hip Fracture Programme **and**
- the Hip Fracture Programme team retains the clinical lead, including patient selection, agreement of length of stay and ongoing objectives for intermediate care **and**
- the Hip Fracture Programme team retains the managerial lead, ensuring that intermediate care is not resourced as a substitute for an effective acute hospital Programme.

1.8.6 Patients admitted from care or nursing homes should not be excluded from rehabilitation programmes in the community or hospital, or as part of an early supported discharge programme.

1.9 Patient and carer information

1.9.1 Offer patients (or, as appropriate, their carer and/or family) verbal and printed information about treatment and care including:

- diagnosis
- choice of anaesthesia
- choice of analgesia and other medications
- surgical procedures
- possible complications
- postoperative care
- rehabilitation programme
- long-term outcomes
- healthcare professionals involved.

2 Notes on the scope of the guidance

NICE guidelines are developed in accordance with a [scope](#) that defines what the guideline will and will not cover.

How this guideline was developed

NICE commissioned the National Clinical Guideline Centre to develop this guideline. The Centre established a Guideline Development Group (GDG); see appendix A), which reviewed the evidence and developed the recommendations. An independent Guideline Review Panel oversaw the development of the guideline (see appendix B).

There is more information about [how NICE clinical guidelines are developed](#) on the NICE website and in [How NICE clinical guidelines are developed: an overview for stakeholders, the public and the NHS](#).

3 Implementation

NICE has developed [tools](#) to help organisations implement this guidance.

4 Research recommendations

The GDG has made the following recommendations for research, based on its review of evidence, to improve NICE guidance and patient care in the future. The GDG's full set of research recommendations is detailed in the full guideline (see section 4.3.6).

4.1 Imaging options in occult hip fracture

In patients with a continuing suspicion of a hip fracture but whose radiographs are normal, what is the clinical and cost effectiveness of computed tomography (CT) compared to magnetic resonance imaging (MRI), in confirming or excluding the fracture?

Why this is important

The GDG's consensus decision to recommend CT over a radionuclide bone scan as an alternative to MRI to detect occult hip fractures reflects current NHS practice but assumes that advances in technology have made the reliability of CT comparable with that of MRI. If modern CT can be shown to have similar reliability and accuracy to MRI, then this has considerable implications because of its widespread availability out of hours and lower cost. It is therefore a high priority to confirm or refute this assumption by direct randomised comparison. The study design would need to retain MRI as the 'gold standard' for cases of uncertainty and to standardise the criteria, expertise and procedures for radiological assessment. Numbers required would depend on the degree of sensitivity and specificity (the key outcome criteria) set as target requirement for comparability, but need not necessarily be very large.

4.2 Anaesthesia

What is the clinical and cost effectiveness of regional versus general anaesthesia on postoperative morbidity in patients with hip fracture?

Why this is important

No recent randomised controlled trials were identified that fully address this question. The evidence is old and does not reflect current practice. In addition, in most of the studies the patients are sedated before regional anaesthesia is administered, and this is not taken into account when analysing the results. The study design for the proposed research would be best

addressed by a randomised controlled trial. This would ideally be a multi-centre trial including 3000 participants in each arm. This is achievable given that there are about 70,000 to 75,000 hip fractures a year in the UK. The study should have three arms that look at spinal anaesthesia versus spinal anaesthesia plus sedation versus general anaesthesia; this would separate those with regional anaesthesia from those with regional anaesthesia plus sedation. The study would also need to control for surgery, especially type of fracture, prosthesis and grade of surgeon.

A qualitative research component would also be helpful to study patient preference for type of anaesthesia.

4.3 Displaced intracapsular hip fractures

What is the clinical and cost effectiveness of large-head total hip replacement versus hemiarthroplasty on functional status, reoperations and quality of life in patients with displaced intracapsular hip fracture?

Why this is important

Large-head total hip replacement is a development of traditional total hip replacement, where a larger head makes the joint more stable and hence reduces the risks of dislocation. Three small trials have shown traditional small-head total hip replacement to have better outcomes and function, albeit with an increased dislocation rate in selected groups of patients. The drawback with large-head arthroplasty is the additional implant cost and theatre time. This cost can account for up to 20% of current NHS tariff (up to £2000) and the study aims to address whether this translates to improved patient outcome. The study design for the proposed research would be best addressed by a randomised controlled trial. This would have two arms to compare current standard care (using hemiarthroplasty) with using large-head total hip replacement for patients sustaining displaced intracapsular hip fractures. The primary outcome would be patient mobility at 1 year and secondary outcomes would include functional outcomes, quality of life and cost effectiveness of the intervention.

It would be expected that a sample size of approximately 500 patients would be required to show a significant difference in the mobility, hip function and quality of life (assuming 80% power, $p < 0.05$). By recruiting through a trauma research network it is estimated that 10 centres would be able to recruit 20 patients per month (from 45 eligible patients) giving a recruitment period of 25 months.

4.4 Intensive rehabilitation therapies after hip fracture

What is the clinical and cost effectiveness of additional intensive physiotherapy and/or occupational therapy (for example progressive resistance training) after hip fracture?

Why this is important

The rapid restoration of physical and self care functions is critical to recovery from hip fracture, particularly where the goal is to return the patient to preoperative levels of function and residence. Approaches that are worthy of future development and investigation include progressive resistance training, progressive balance and gait training, supported treadmill gait re-training, dual task training, and activities of daily living training. The optimal time point at which these interventions should be started requires clarification.

The ideal study design is a randomised controlled trial. Initial studies may have to focus on proof of concept and be mindful of costs. A phase III randomised controlled trial is required to determine clinical effectiveness and cost effectiveness. The ideal sample size will be around 400 to 500 patients, and the primary outcome should be physical function and health-related quality of life. Outcomes should also include falls. A formal sample size calculation will need to be undertaken. Outcomes should be followed over a minimum of 1 year, and compare if possible, either the recovery curve for restoration of function or time to attainment of functional goals.

4.5 Early supported discharge in care home patients

What is the clinical and cost effectiveness of early supported discharge on mortality, quality of life and functional status in patients with hip fracture who are admitted from a care home?

Why this is important

Residents of care and nursing homes account for about 30% of all patients with hip fracture admitted to hospital. Two-thirds of these come from care homes and the remainder from nursing homes. These patients are frailer, more functionally dependent and have a higher prevalence of cognitive impairment than patients admitted from their own homes. One-third of those admitted from a care home are discharged to a nursing home and one-fifth are readmitted to hospital within 3 months. There are no clinical trials to define the optimal rehabilitation pathway following hip fracture for these patients and therefore represent a discrete cohort where the existing meta-

analyses do not apply. As a consequence, many patients are denied structured rehabilitation and are discharged back to their care home or nursing home with very little or no rehabilitation input.

Given the patient frailty and comorbidities, rehabilitation may have no effect on clinical outcomes for this group. However, the fact that they already live in a home where they are supported by trained care staff clearly provides an opportunity for a systematic approach to rehabilitation. Early multidisciplinary rehabilitation based in care homes or nursing homes would take advantage of the day-to-day care arrangements already in place and provide additional NHS support to deliver naturalistic rehabilitation, where problems are tackled in the patient's residential setting.

Early supported multidisciplinary rehabilitation could reduce hospital stay, improve early return to function, and affect both readmission rates and the level of NHS-funded nursing care required.

The research would follow a two-stage design: (1) an initial feasibility study to refine the selection criteria and process for reliable identification and characterisation of those considered most likely to benefit, together with the intervention package and measures for collaboration between the Hip Fracture Programme team, care-home staff and other community-based professionals, and (2) a cluster randomised controlled comparison (for example, with two or more intervention units and matched control units) set against agreed outcome criteria. The latter should include those specified above, together with measures of the impact on care-home staff activity and cost, as well as qualitative data from patients on relevant quality-of-life variables.

5 Other versions of this guideline

5.1 Full guideline

The full guideline, [The management of hip fracture in adults](#), contains details of the methods and evidence used to develop the guideline. It is published by the National Clinical Guideline Centre.

5.2 Information for the public

NICE has produced [information for the public](#) explaining this guideline.

We encourage NHS and voluntary sector organisations to use text from this information in their own materials about management of hip fractures.

6 Related NICE guidance

Published

- [Alendronate, etidronate, risedronate, raloxifene, strontium ranelate and teriparatide for the secondary prevention of osteoporotic fragility fractures in postmenopausal women](#) (amended). NICE technology appraisal guidance 161 (2011).
- [Alendronate, etidronate, risedronate, raloxifene and strontium ranelate for the primary prevention of osteoporotic fragility fractures in postmenopausal women](#) (amended). NICE technology appraisal guidance 160 (2011).
- [Denosumab for the prevention of osteoporotic fractures in postmenopausal women](#). NICE technology appraisal guidance 204 (2010).
- [Delirium](#). NICE clinical guideline 103 (2010).
- [Venous thromboembolism – reducing the risk](#). NICE clinical guideline 92 (2010).
- [Minimally invasive hip replacement](#). NICE interventional procedure guidance 363 (2010).
- [Surgical site infection](#). NICE clinical guideline 74 (2008).
- [Dementia](#). NICE clinical guideline 42 (2006).
- [Nutrition support in adults](#). NICE clinical guideline 32 (2006).
- [Pressure ulcers](#). NICE clinical guideline 29 (2005).
- [Falls](#). NICE clinical guideline 21 (2004).
- [Preoperative tests](#). NICE clinical guideline 3 (2003).
- [Guidance on the use of metal on metal hip resurfacing arthroplasty](#). NICE technology appraisal guidance 44 (2002).
- [The selection of prostheses for primary total hip replacement](#). NICE technology appraisal guidance 2 (2000).

Under development

NICE is developing the following guidance (details available from www.nice.org.uk):

- Osteoporosis: risk assessment of people with osteoporosis. NICE clinical guideline. Publication date to be confirmed.

7 Updating the guideline

NICE clinical guidelines are updated so that recommendations take into account important new information. New evidence is checked 3 years after publication, and healthcare professionals and patients are asked for their views; we use this information to decide whether all or part of a guideline needs updating. If important new evidence is published at other times, we may decide to do a more rapid update of some recommendations. Please see our website for information about updating the guideline.

Appendix A: The Guideline Development Group, the National Clinical Guideline Centre and the NICE project team

The Guideline Development Group

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Tessa Somerville Patient member.

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Anthony Gildea Guideline Coordinator

Judith Thornton Technical Lead

Linda Landells (to January 2011), Sarah Palombella (from February 2011) Senior Medical Editor

Alan Pedder Medical Editor

Appendix B: The Guideline Review Panel

The Guideline Review Panel is an independent panel that oversees the development of the guideline and takes responsibility for monitoring adherence to NICE guideline development processes. In particular, the panel ensures that stakeholder comments have been adequately considered and responded to. The panel includes members from the following perspectives: primary care, secondary care, lay, public health and industry.

Graham Archard GP, Dorset

Catherine Arkley Lay Member

Mike Drummond (Chair) Director, Centre for Health Economics, University of York

David Gillen Medical Director, Wyeth Pharmaceutical

Ruth Stephenson Consultant Anaesthetist, Department of Anaesthetics, Aberdeen Royal Infirmary

Appendix C: The algorithm

A care pathway can be found in the [NICE pathway on hip fracture](#).

Changes after publication

March 2014:

The introduction to the full guideline and the wording of recommendation 1.1.1 have been amended to clarify how an occult fracture is identified and when an MRI scan should be done.

About this guideline

NICE clinical guidelines are recommendations about the treatment and care of people with specific diseases and conditions in the NHS in England and Wales.

The guideline was developed by the National Clinical Guideline Centre for Acute and Chronic Conditions. The Centre worked with a group of healthcare professionals (including consultants, GPs and nurses), patients and carers, and technical staff, who reviewed the evidence and drafted the recommendations. The recommendations were finalised after public consultation.

The methods and processes for developing NICE clinical guidelines are described in [The guidelines manual](#).

We have produced [information for the public](#) explaining this guideline. Tools to help you put the guideline into practice and information about the evidence it is based on are also [available](#).

Changes after publication

January 2012: minor maintenance

March 2013: minor maintenance

October 2013: minor maintenance

Your responsibility

This guidance represents the view of NICE, which was arrived at after careful consideration of the evidence available. Healthcare professionals are expected to take it fully into account when exercising their clinical judgement. However, the guidance does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer, and informed by the summary of product characteristics of any drugs they are considering.

Implementation of this guidance is the responsibility of local commissioners and/or providers. Commissioners and providers are reminded that it is their responsibility to implement the guidance, in their local context, in light of their duties to avoid unlawful discrimination and to have

regard to promoting equality of opportunity. Nothing in this guidance should be interpreted in a way that would be inconsistent with compliance with those duties.

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