education

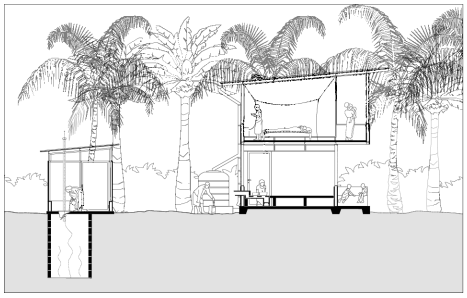
RESEARCH REVIEWS Fortnightly round up from the leading medical journals

Combination pills after intracerebral haemorrhage

Although single pill combination antihypertensives are available in the UK, prescribing each medication as an individual tablet is the norm. A large multicentre trial explored the use of a pill containing low doses of three antihypertensives to reduce stroke recurrence in people with a recent intracerebral haemorrhage. 1670 participants took the

pill (containing telmisartan 20 mg, amlodipine 2.5 mg, and indapamide 1.25 mg) for a minimum of two weeks, before being randomised to either continue treatment or switch to a placebo. Although both arms of the trial received standard care, including guidance on escalating antihypertensive treatment, those in the triple pill group had lower blood pressure than those in the placebo group during the follow-up period (127 mm Hg versus 138 mm Hg, respectively). At a median follow-up of 2.5 years, stroke recurrence had occurred in 4.6% of the triple pill group versus 7.4% in the placebo group (hazard ratio 0.61, 95% confidence interval 0.41 to 0.92).

NEJM doi:10.1056/NEJMoa2515043



MSHAMU S, MUKAKA M, SANGA C, ET AL. *NATURE MED* 2026 DOI:10.1038/S41591-026-04367-W

Getting the Star treatment

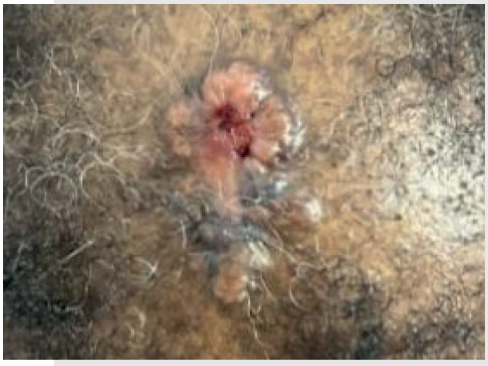
The Star Home is designed to be insect proof, cleaner, cooler, and safer than a traditional home. 110 Star Homes, each costing $8818, were built in Tanzania and allocated through a lottery system as part of a randomised controlled trial. Features include rainwater harvesting, solar panels, and cooling features to improve comfort and enable bed net use at night (see image). The trial's findings would make any pharmaceutical company envious: after three years children living in the homes had 44% less malaria, 30% less diarrhoea, and 18% less acute respiratory infection than children living in traditional homes.

Nat Med doi:10.1038/s41591-026-04367-w

Impact of a suicide and crisis line

In 2022 the US invested $1.5bn to launch a national suicide and crisis phoneline, 988. A research letter in *JAMA* has found a decline in suicides in people aged 15 to 34 since the line was launched. Using data from death certificates, 35 529 suicides were observed between July 2022 and December 2024, 4372 lower than the 39 901 predicted based on previous trends. The authors noted that over the same period there was no reduction in suicides in this

CLINICAL PICTURE An ulcerated lesion on the scalp



A woman in her 70s presented with a 22×15 mm raised scalp lesion with central ulceration. Her medical history included anal squamous cell carcinoma (treated with radical radiotherapy), non-diabetic hyperglycaemia, osteoarthritis, and hypertension. She also recalled a burn to the scalp in early adulthood from a hot comb used for hair styling. Initially, the lesion appeared as a scab with intermittent itchiness and bleeding. Over several years, it gradually enlarged, prompting dermatological referral. Biopsy confirmed nodulocystic basal cell carcinoma (BCC). The patient underwent wide local excision, with histopathology confirming clear margins.

BCC is the skin cancer that is diagnosed most often globally, predominantly affecting people with fair skin who are more prone to sunburn. Risk factors include immunosuppression, genetic syndromes such as xeroderma pigmentosum and Gorlin syndrome, and sites of chronic inflammation such as previous trauma or scarring. Although squamous cell cancer

age group in England, which did not change its national crisis services during this time.

JAMA doi:10.1001/jama.2026.5157

Dementia screening and family members

A new randomised controlled trial of dementia screening examined the impact of screening on family members. It found that health related quality of life, markers of depression, anxiety, and caregiver preparedness were unchanged by the intervention. The US based trial randomised people over 65 who had a family member living nearby who was the person most likely to provide care for them if needed. 1802 of these dyads were randomised to screening only, screening plus diagnostic assessment, or no screening groups. Only 62 (5.1%) screened positive, which may partly explain the lack of impact on family members. Over a third of those who screened positive in the screening plus diagnostic assessment group declined follow-up.

JAMA Intern Med doi:10.1001/jamainternmed.2026.0844

Stimulating sleep apnoea study

2017 HealthTech guidance by the National Institute for Health and Care Excellence (NICE) recommended that hypoglossal nerve stimulation for moderate to severe obstructive sleep apnoea (OSA) "should only be used with special arrangements for clinical governance, consent, and audit or research." A new trial of 104 patients with OSA found that 58% of those who received the treatment achieved the pre-defined improvements in apnoea-hypopnoea index after seven months compared with 13.5% in the control group. The guidance noted that NICE may update its recommendations on publication of further evidence. We'll see whether this small, unblinded trial with short follow-up prompts it to do so.

Ann Intern Med doi:10.7326/ANNALS-25-04414

Tom Nolan, clinical editor, *The BMJ*, London; sessional GP, Surrey

Cite this as: *BMJ* 2026;393:s847

is the commonest cancer arising at the site of previous burn scars, BCC can more rarely occur. Although non-melanoma skin cancers are 10-20 times more common in people with skin that burns easily in the sun, this case highlights the need to include BCC in the differential diagnosis of skin lesions in patients with darker skin, particularly when other risk factors are present.

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Patient consent obtained.

Cite this as: *BMJ* 2026;393:e083149

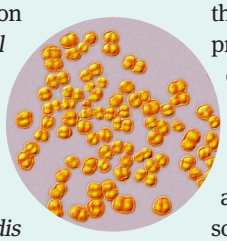
MINERVA From the wider world of research

Sleep, diet, exercise

Sleep, physical activity, and nutrition are lifestyle behaviours that influence cardiovascular disease risk. In the UK Biobank study, the most favourable combination—at least eight hours' sleep each night, an hour a day of moderate to vigorous activity, and a high score for diet quality—carried less than half the risk of major adverse cardiovascular events than the least favourable combination. Even small differences mattered. Ten extra minutes of sleep, five minutes more exercise, and three more points on the diet score, together were equivalent to a 10% lowering of risk (*Eur J Prev Cardiol* doi:10.1093/eurjpc/zwag141).

Global burden of meningitis

Meningitis is the leading infectious cause of neurological disabilities globally, disproportionately affecting children under 5 years living in the sub-Saharan meningitis belt, which extends from Senegal to Ethiopia. Although the incidence is declining, an analysis in the 2023 Global Burden of Disease study estimated 259 000 deaths and 2.5 million cases (*Lancet Neurol* doi:10.1016/S1474-4422(26)00101-8). *Streptococcus pneumoniae* and *Neisseria meningitidis* caused most deaths, while non-polio enteroviruses accounted for most cases.



Incisional hernias

In 2015, the STITCH trial showed that patients whose midline laparotomies were closed using a small bites technique (fascia closed at 5 mm intervals) had developed fewer incisional hernias one year after surgery than those closed with larger bites (10 mm intervals). Longer term follow-up, 13 years later, shows that the benefits persist. The cumulative incidence of hernias was 34% in the small bites group, compared with 49% among the large bites group, and the hernias that did occur were smaller (*JAMA Surg* doi:10.1001/jamasurg.2026.0618).

Cognitive outcomes after preterm birth

Advances in perinatal care have improved survival for infants born preterm (<37 weeks' gestation) or with low birth weight (<2500 g), but an umbrella review shows that these children have poorer educational outcomes in reading, mathematics, and spelling, and that these disadvantages persist into adult life. The deficits were greater at earlier gestational ages and lower birth weights (*JAMA Pediatr* doi:10.1001/jamapediatrics.2026.0533).

Prostate cancer screening

In the 1930s and 40s, the famous physiologist J B S Haldane regularly wrote about science in the *Daily Worker*. The tradition of discussing scientific matters of public importance lives on in that newspaper's successor, the *Morning Star*, where a piece on prostate cancer screening lucidly explained why expanding screening using prostate specific antigen levels is likely to do more harm than good (https://morningstaronline.co.uk/article/prostate-cancer-screen-or-not-screen). Minerva hopes it will prove a counterweight to the recent celebrity appeals for testing to be more widely available.

Tavapadon

Tavapadon is an oral, once daily selective D1/D5 partial dopamine agonist intended to ameliorate the motor symptoms of Parkinson's disease without provoking dyskinesias and other adverse effects associated with less targeted ways of boosting striatal dopamine levels. The findings of a phase 3 trial in more than 500 patients with early disease are encouraging. Motor function showed a sustained improvement in those receiving the active drug, with few adverse events (*JAMA Neurol* doi:10.1001/jamaneurol.2026.0590).

Cite this as: *BMJ* 2026;393:s825

STATE OF THE ART REVIEW

Advances in the pathophysiology and treatment of diabetic peripheral neuropathy

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This is a summary of Clinical Review Advances in the pathophysiology and treatment of diabetic peripheral neuropathy. The full version can be read here: https://www.bmj.com/content/392/bmj-2024-081217

CPD READING
0.5 HOURS

Diabetic peripheral neuropathy (DPN) is a common, debilitating disorder that results in sensory loss, gait dysfunction, propensity to skin ulceration that can lead to limb amputations, and neuropathic pain. DPN has a negative impact on patients' mood and quality of life and is also associated with increased mortality. Aggressive treatment of hyperglycaemia does not adequately prevent DPN, particularly in patients with type 2 diabetes, and new, more effective treatments are urgently needed. Recent decades have witnessed a growing understanding of the risk factors and molecular mechanisms of DPN, such as the importance of axoglial interactions and metabolic derangements beyond hyperglycaemia. Despite expanding knowledge, the translation of preclinical insights to treatments that benefit patients remains challenging (fig 1).

DPN affects up to 50% of people living with diabetes.[1-4] A systematic analysis from the Global Burden of Disease Study in 2021 identified DPN as one of the top five leading neurological causes of cumulative fatal and non-fatal disease burden.

WHAT YOU NEED TO KNOW

- Diabetic peripheral neuropathy affects up to 50% of people living with diabetes. It results in sensory loss and gait dysfunction, as well as propensity to foot ulceration that can lead to amputations
- Many patients experience chronic neuropathic pain that can be difficult to manage with drugs
- The past several decades have seen progress in defining risk factors and molecular mechanisms underlying diabetic peripheral neuropathy, specifically a growing appreciation for the contribution of metabolic derangements beyond hyperglycaemia
- Despite these advances, no disease modifying treatment is available for diabetic peripheral neuropathy aside from optimising control of glycaemic and metabolic risk factors

Epidemiology

A study encompassing 219 data sources from broad geographic regions between 2005 and 2020 across 215 countries estimated a global prevalence of diabetes at 10.5% (536.6 million people), with an anticipated rise to 12.2% (783.2 million) by 2045.[12] Reported prevalence of DPN has varied across geographic regions, with a range of 20-50% in people with type 2 diabetes and 17-54% in those with type 1 diabetes.[2-14] In addition to reflecting regional differences in patient demographics, DPN risk factors, and varied clinical practices, this variability reflects the differing diagnostic approaches and definitions of DPN across studies.[15]

A high prevalence of DPN has been reported in large cohorts of participants with youth onset type diabetes.[16-18] The SEARCH for Diabetes in Youth (SEARCH) cohort study found a prevalence of 22% and 7% among young people with type 2 and type 1 diabetes, respectively (n=1734 for type 1 diabetes; n=258 for type 2 diabetes).[16] A 25.4% increase in the prevalence of neuropathy over 14 years was also observed in the Treatment Options for Type 2 Diabetes in Adolescents and Youth (TODAY) study (n=674).[17]

Neuropathic pain is not universal in people with DPN, and the absence of pain may be resulting in underestimations of DPN prevalence.

Metabolic risk factors

Diabetes: severity and duration

Diabetes is the leading cause of peripheral neuropathy, and both duration and severity of diabetes contribute to the risk of having DPN among people with diabetes.[24] Severity of hyperglycaemia, often measured by glycated haemoglobin (haemoglobin A_{1c} (HbA_{1c})), has consistently been associated with increased risk of DPN in prospective cohort studies.[24 25] Furthermore, longer durations of diabetes increase the likelihood of DPN independently of age and HbA_{1c} level.[24 25]

Several studies have assessed how other markers of diabetes are associated with DPN. For example, hyperinsulinemia, measured as high β cell function (homeostatic model assessment (HOMA)2-B) and low insulin sensitivity (HOMA2-S) was found to increase the risk of DPN among 3397 Danish adults with type 2 diabetes.[26]

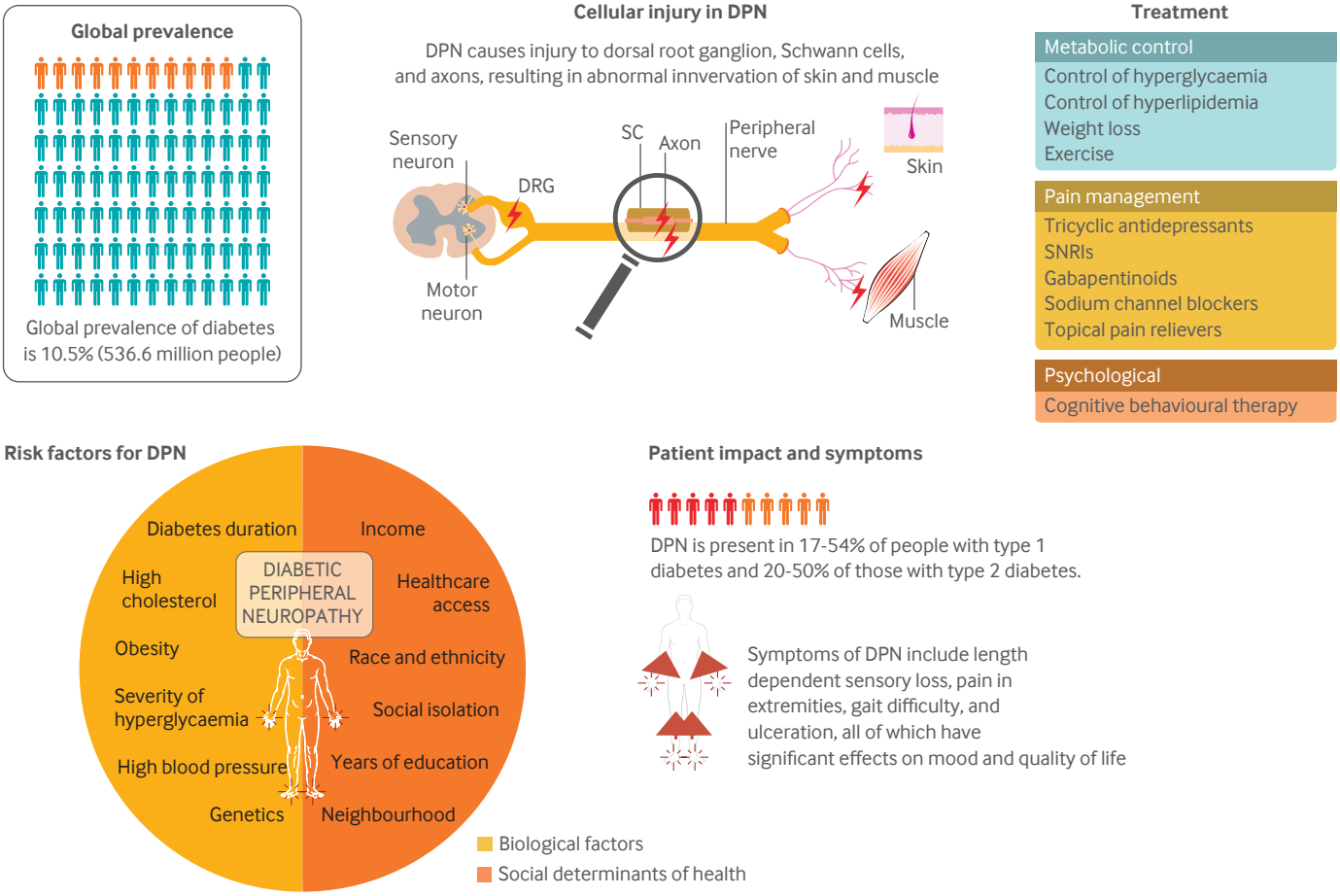


Fig 1 | Overview of diabetic peripheral neuropathy (DPN)

Metabolic syndrome

Metabolic syndrome—a cluster of risk factors including hyperglycaemia, abdominal obesity, hypercholesterolemia, hypertriglyceridemia, and hypertension—has been found to increase the likelihood of DPN in both type 1 diabetes and type 2 diabetes.[29]

The largest study to date, the Metascreen multicenter diabetes survey, found that having the metabolic syndrome increased the likelihood of having DPN in 7859 people with type 2 diabetes and 638 people with type 1 diabetes.[30] Several additional studies in people with type 2 diabetes have confirmed this finding.[31-35] Although fewer studies have assessed the association between the metabolic syndrome and DPN in type 1 diabetes, one large study from Australia (n=1914) found that having the metabolic syndrome increased the odds of DPN.[36]

Obesity

After hyperglycaemia, obesity is the second leading metabolic risk factor for peripheral neuropathy in people with and without diabetes.[38] Multiple worldwide studies in people with diabetes living in Africa, Asia, Europe, and North America have found obesity to be associated with increased risk of DPN in people with type 2 diabetes.[17-45]

The largest study evaluating associations between obesity metrics and DPN included 29 762 people with type 2 diabetes in the UK Biobank and found that larger body mass index (BMI) and waist circumference were associated with DPN.[42] In addition, a secondary analysis of data from 7442 people with type 2 diabetes enrolled in the ACCORD trial found BMI and waist circumference to be associated with incident DPN.[45]

Several large studies have also identified associations between obesity and DPN in people with type 1 diabetes. The largest study to date, based on data from the US T1D Exchange cohort, found that higher BMI was associated with DPN among 5936 people with type 1 diabetes.[46] Similarly, the SEARCH for Diabetes in Youth study found that among 1734 young people with type 1 diabetes, BMI and waist circumference were larger in those with DPN.[16] Finally, the European Diabetes Prospective Complications (EURODIAB) study found higher BMI to be associated with incident DPN among 1172 people with type 1 diabetes.[47]

Other metabolic risk factors

Other individual metabolic syndrome risk factors, including triglycerides, high density lipoprotein (HDL) cholesterol, and hypertension, also increase the risk of DPN.[24 25]

A 2021 meta-analysis included data from 32 668 patients with diabetes from 39 studies and assessed

associations of concentrations of triglycerides, HDL cholesterol, low density lipoprotein (LDL) cholesterol, and total cholesterol with DPN. In alignment with the individual risk factors included in the metabolic syndrome, the meta-analysis found that triglyceride and HDL cholesterol concentrations, but not LDL or total cholesterol concentrations, were associated with DPN.[52] Notably, several recent large studies have confirmed the importance of triglycerides for DPN risk.[53] Similarly, a large 2024 study of 13 315 adults with type 2 diabetes from China found triglycerides, but not HDL or LDL cholesterol, to be associated with DPN.[54] By contrast, in people with type 1 diabetes, the EURODIAB study found that total cholesterol, LDL cholesterol, and triglycerides each increased the odds of incident DPN.[47] Taken together, current evidence suggests that lipid profiles, particularly triglyceride concentrations, are important risk factors for DPN.[55]

Multiple cross sectional studies have found that the presence of hypertension increases the risk of DPN.[56] Cross sectional studies of adults with type 2 diabetes in China (n=14 908 and n=13 315) and across 14 countries in the International Prevalence and Treatment of Diabetes and Depression study found that hypertension increased the odds of DPN, even after comprehensive adjustment for other DPN risk factors.[54-58] Furthermore, two cross sectional studies of Japanese adults with type 2 diabetes (n=9914 and n=5451) found higher systolic blood pressure to be associated with increased odds of DPN.[41 59] By contrast, the ADDITION-Denmark and DD2 studies did not find hypertension or blood pressure to increase the likelihood of DPN.[43 44] For people with type 1 diabetes, both the EURODIAB and SEARCH studies found that hypertension increased the likelihood of having DPN.[16-58]

Discrepancies in the association between DPN and hypertension might be explained by differences in population characteristics, differences in DPN assessments, or lack of consistent statistical adjustment for other relevant risk factors.

Social determinants of health

Multiple social determinants of health (SDOH) have been linked with the development of DPN in observational studies. Increased composite index scores have been associated with increased prevalence of DPN among adults with type 1 diabetes in Scotland and with increased use of drugs for painful DPN among adults with type 2 diabetes in England, even after control for other DPN risk factors such as duration of diabetes and age.[61 62] In Romania, unemployment rates and gross domestic product per capita were associated with increased prevalence of DPN among patients with diabetes admitted to hospital.[63] SDOH assessed at the individual level have also been linked with DPN development. Among patients with type 1 diabetes enrolled in the US T1D Exchange Registry, those with DPN were more likely to be black, less likely to have a college education, and less likely to have private insurance coverage.[46] Together, these studies suggest that the prevalence of DPN may be greater in people in positions of socioeconomic disadvantage, although data remain limited.

DPN affects up to 50% of people living with diabetes

A smaller but growing body of evidence supports an association between SDOH and DPN outcomes. In one US health system study of 144 564 individuals, adults with infected diabetic foot ulcers had greater levels of neighbourhood disadvantage than adults with uninfected diabetic foot ulcers.[64]

The mechanisms by which SDOH lead to development of DPN have not been well established. These factors probably act directly and indirectly to influence health outcomes. Directly, SDOH such as income and education have been associated with increased risk of developing diabetes and disease progression.[66] This relation may be indirectly mediated by access to quality diabetes care as people residing in neighbourhoods with greater Area Deprivation Index scores were less likely to achieve optimal diabetes targets than those residing in neighbourhoods with lower scores.[67 68] However, in some cases, the mechanism of social determinants remains unclear.

Pathophysiology

DPN involves complex pathological changes at the cellular level, particularly affecting neurons in the dorsal root ganglia and their supportive glia, the Schwann cells. These components are essential for preserving nerve function and integrity, and their dysfunction contributes to disease progression. Evidence from experimental and clinical studies shows that these cellular disruptions are primarily driven by diabetes induced metabolic imbalances, such as hyperglycaemia and dyslipidaemia, which impair nerve metabolism, favour oxidative and pro-inflammatory conditions, and ultimately lead to bioenergetic failure (fig 2, bmj.com).[73]

Diagnosis

History and examination

The most common symptoms of DPN are numbness, tingling, and/or pain starting in the toes and ascending the legs.

Neurological examination often reveals length dependent changes in pinprick/temperature sensation (small fibre) and/or vibration/proprioception sensation (large fibre). Large fibre sensation can be assessed using a 128 Hz tuning fork on the great toe. Examination with a 10 g monofilament can also be used to evaluate for loss of protective sensation and risk of ulceration; however, a monofilament does not reliably detect early DPN. Reflexes in DPN are often decreased or absent in a length dependent fashion. Weakness is usually a later finding in patients with severe DPN, with weakness starting in toe extension. Finally, a careful examination of the foot architecture and skin is important in identifying mild deformities, calluses, or skin breakdown that can increase the risk of ulcers.

Family history can inform the chance of an inherited cause. An extensive alcohol history should be obtained given that alcoholic neuropathy is one of the most common causes of neuropathy.[141]

Investigations

Laboratory evaluation of DPN should include a full blood count, comprehensive metabolic panel, vitamin B_{12} concentration, and serum protein electrophoresis with immunofixation.[143] Diabetes is commonly identified at the time of diagnosis of neuropathy with testing such as haemoglobin A_{1c} and/or glucose tolerance testing.[144]

More extensive laboratory testing is not needed unless atypical features are present as discussed above.[145] Electrodiagnostic studies are usually not needed for a diagnosis of DPN, as they rarely change the diagnosis or management.[139] Therefore, these tests should be reserved for patients with atypical features and/or where doubt exists about the relative contributions of multiple peripheral nervous system conditions. The American Diabetes Association's position statement recommends against routine use of electrodiagnostic testing for the evaluation of DPN.[1]

Similarly, magnetic resonance imaging (MRI) of the brain and spinal cord is not needed in the evaluation of patients with suspected DPN, as it rarely changes the diagnosis or management.[139] Choosing Wisely guidelines recommend against ordering MRI for the evaluation of neuropathy.[146] Electrodiagnostic testing and MRI are the main drivers of cost in the evaluation of DPN, so cost effective approaches to diagnosis of DPN should reserve these tests for atypical cases.[147]

Similarly to electrodiagnostic studies for large fibre involvement, skin biopsies are the best confirmatory test for small fibre involvement but are rarely needed to make a clinical diagnosis of DPN.[149] Corneal confocal microscopy also evaluates small fibre involvement but is not needed for the diagnosis of DPN.[150-152] Overall, DPN is a clinical diagnosis that requires simple blood tests, with further testing reserved for individuals with atypical features. Improvements in diagnostic practices are needed, but which provider and system level interventions would optimise practice is uncertain.

Treatment

Disease modifying treatments

Disease modifying treatments for DPN are limited. Control of hyperglycaemia is the main intervention available; however, the effect of enhanced control on prevention of DPN is limited in patients with type 2 diabetes, with a small effect observed (annualised risk difference of neuropathy −0.58, 95% confidence interval (CI) −1.17 to 0.01) in a meta-analysis (n=6669) that did not meet statistical significance.[153] By contrast, hyperglycaemia control had a much more robust effect on reducing DPN in patients with type 1 diabetes (annualised risk difference of neuropathy −1.84, 95% CI −2.56 to −1.11; n=1228). Dietary weight loss in conjunction with exercise counselling had a modest effect on neuropathy outcomes in a large and long randomised controlled trial (n=5145 over 9-11 years); mean Michigan Neuropathy Screening Instrument (MNSI) questionnaire score in intervention group 2.21 (standard deviation (SD) 0.03) versus 2.35 (0.03) in education control group; P<0.001).[154]

An observational study also reported comparable results (n=72 over 2 years; mean MNSI questionnaire score improved by 0.6 (SD 1.4); P<0.01).[155] Similarly, observational studies of surgical weight loss show improvements in neuropathy outcomes (n=79 over 2 years; intraepidermal nerve fibre density (IENFD) thigh improvement of 3.4 (SD 7.8); P<0.01), but randomised trials are not available and most studies are small.[38] Many small exercise studies have also been conducted, with most showing improvements in neuropathy outcomes including nerve fibre density on skin biopsy.[156] However, a large definitive randomised study of exercise interventions has not been published to date. Taken together, disease modifying treatment includes a focus on hyperglycaemia, diet, and exercise, which can all be managed by primary care providers.

Neuropathic pain treatment

Drugs

Given limitations with disease modifying therapies, most treatment of DPN focuses on neuropathic pain. A significant proportion of patients with DPN do not experience pain,[8 157] but those with neuropathic pain experience worse quality of life, depression, anxiety, and sleep, making this a critical aspect of treatment.[8] Several guidelines have recommended tricyclic antidepressants, serotonin norepinephrine reuptake inhibitors (SNRIs), and gabapentinoids for the treatment of painful DPN.[158-162]

More recently, the American Academy of Neurology guideline and meta-analysis confirmed these findings and added sodium channel blockers as an effective class.[163] The effect sizes for these drugs are relatively modest (standardised mean differences 0.44-0.95), and all have potential side effects. One comparative effectiveness study, OPTION-DM (n=130), showed that amitriptyline (tricyclic antidepressant), duloxetine (SNRI), and pregabalin (gabapentinoid) had the same efficacy (mean difference −0.01 or less on pain numerical rating scale) and that combining drugs from different classes has additional benefit over monotherapy (mean reduction of 1.0 (SD 1.3) *v* 0.2 (1.5) on pain numerical rating scale).[164] Another pragmatic comparative effectiveness study in idiopathic neuropathy (n=402) showed that nortriptyline and duloxetine (probabilities of highest utility 0.52 and 0.43) were superior to pregabalin and mexiletine (probabilities of highest utility 0.05 and 0.00) for the treatment of neuropathic pain.[165] Importantly, pregabalin had problems with insurance approval in the US and mexiletine with tolerability. Therefore, the efficacies of tricyclic antidepressants, SNRIs, gabapentinoids, and sodium channel blockers are likely similar given the results of a meta-analysis based on a considerable

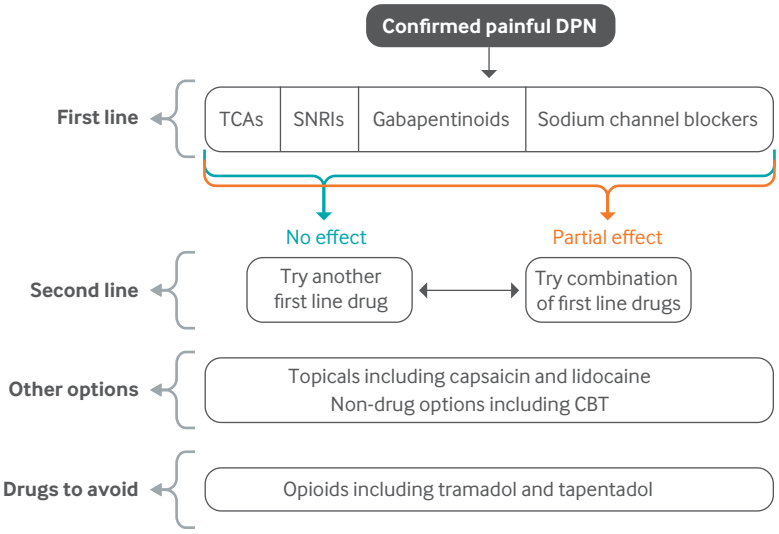


Fig 3 | Treatment algorithm for painful diabetic peripheral neuropathy (DPN) based on the 2022 American Academy of Neurology guideline and meta-analysis. CBT=cognitive behavioural therapy; SNRI=serotonin-norepinephrine reuptake inhibitor; TCA=tricyclic antidepressant

number of large, randomised trials and the OPTION-DM trial. Given the similar efficacy, other factors should be taken into account when choosing which drug to start, including medical comorbidities (fig 3).[166]

Non-drug treatment

Among non-drug approaches for DPN, cognitive behavioural therapy (CBT) is the best studied.[172-174] A meta-analysis found that CBT (n=4 trials) and mindfulness (n=3 trials) had similar reductions in painful DPN, but only CBT had a statistically significant effect.[175] Similarly, a meta-analysis showed that acupuncture (n=12 trials) significantly reduces painful DPN.[176]

All the above options are preferred to opioids given the long term risks associated with these drugs, including misuse, addiction, overdose, fractures, and myocardial infarction.[177]

HOW PATIENTS WERE INVOLVED IN THE CREATION OF THIS ARTICLE

While writing this manuscript, we consulted a patient who is living with severe diabetic peripheral neuropathy (DPN). She reviewed the article and provided feedback. We asked the patient about what clinical and scientific aspects she thought were most pressing for patients affected by DPN. She emphasised the need to educate patients about the high prevalence of DPN, the broad phenotypic spectrum of the disease, and the varied metabolic risk factors to ensure that patients know that the condition is common, differs in its presentation, and is not necessarily in their control. She believed that more education about the causes of DPN would alleviate the guilt that patients feel when DPN progresses despite their efforts to modify their lifestyles. She also stated that clinicians should continue to stress the potential for negative impact on mood and work productivity related to the side effects of neuropathic pain medication and to instruct patients to communicate such side effects as soon as they become aware of them. Finally, the patient expressed the need for broader patient education on treatment approaches for neuropathic pain that are not yet substantiated by scientific studies. She appreciated the scientific and medical community's efforts to develop more effective treatments for DPN and alleviate patients' suffering.

Emerging treatments

Newer drugs for diabetes, glucagon-like peptide-1 (GLP-1) receptor agonists, sodium-glucose cotransporter 2 (SGLT2) inhibitors, and dipeptidyl peptidase 4 (DPP4) inhibitors, are now available, but whether they affect neuropathy outcomes remains to be determined. Glucagon-like peptide-1 receptor agonists and dipeptidyl peptidase 4 inhibitors have been best studied to date, but only a few, small, randomised trials have been completed with mixed results.[185-187]

Guidelines

The American Diabetes Association (ADA) publishes an annual "Standards of Care in Diabetes" guideline that provides recommendation on DPN screening and treatment. In 2026 the ADA recommends DPN screening at diagnosis of type 2 diabetes, at five years after diagnosis of type 1 diabetes, and annually thereafter in both groups.[231] Specifically, the screening assessment should include a test for small fibre neuropathy (pinprick or temperature sensation) and a test for large fibre neuropathy (vibration). In addition, 10 g monofilament testing is suggested to evaluate for risk of ulcers. For treatment, the ADA recommends optimising glucose management, weight, blood pressure, and lipids.[231]

Most DPN guidelines pertain to the treatment of painful DPN. A consensus exists in several guidelines that gabapentinoids, SNRIs, and tricyclic antidepressants are effective at reducing DPN pain.[158-163] Differences in the guidelines mainly focus on the role of opioids, sodium channel blockers, and topical medications. Three guidelines discuss supportive evidence for opioids in DPN, with two providing recommendations for opioids as second or third line options.[158-162] By contrast, the American Academy of Neurology and ADA guidelines explicitly recommend against the use of opioids, including tramadol and tapentadol (SNRI/opioids) for painful DPN.[163 231] Furthermore, three guidelines provided evidence supporting two specific sodium channel blockers (carbamazepine and oxcarbamazepine), with another reporting that evidence for the efficacy of multiple sodium channel blockers was inconclusive.[158-162] However, the first guideline evaluating for class effects, rather than the effects of specific drugs, found that sodium channel blockers have similar efficacy to gabapentinoids, SNRIs, and tricyclic antidepressants.[163] Finally, three guidelines support the use of topical capsaicin, with one guideline stating that this topical agent is not effective or has discrepant results.[158-163] One guideline supports topical lidocaine,[160] but this is not mentioned in many guidelines.

Competing interests: BCC has received editorial and research support from the American Academy of Neurology, consults for Dynamed, and does medical legal consultations including the vaccine injury compensation program.

Cite this as: *BMJ* 2026;392:e081217

Find the full version with references at doi: 10.1136/bmj-2024-081217

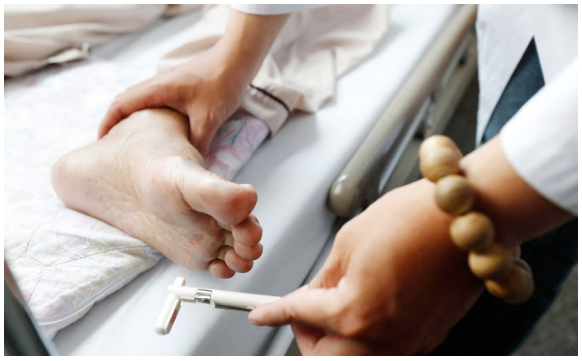
EDITORIAL

Diabetic peripheral neuropathy and the broader complication burden

Effective care requires a holistic approach to account for diverse disease manifestations

Complications of diabetes pose a noticeable burden for individuals and society.[1 2] In a recent review in *The BMJ* (doi:10.1136/BMJ-2024-081217), Fridman and colleagues describe advances in the pathophysiology and treatment of diabetic peripheral neuropathy (DPN).[3] The review of DPN covers epidemiology and risk factors, pathophysiology, diagnosis, treatment, as well as global considerations.[3] The authors acknowledge that translation of emerging evidence into clinical practice remains challenging. However, since microvascular complications of diabetes are often systemic,[4 5] clinical assessments should account for the patient's total complication burden.

In the review, the authors suggest that the presence of atypical neurological features should lead to more extensive investigations, such as electrodiagnostic testing to explore alternative causes of peripheral neuropathy.[6] However, this should also be the case if there is peripheral neuropathy without accompanying retinopathy. Clinical assessment should also involve consideration of autonomic neuropathic features. For example QTc prolongation in those presenting with type 2 diabetes and foot ulceration is a strong predictor of premature mortality in this group.[7] In one study, the eight year mortality was 92.1% for those with QTc prolongation in patients with type 2 diabetes and HbA_{1c} <58 mmol/mol attending a foot ulcer clinic, compared with 48.8% in those without QTc prolongation.[8] Furthermore, although loss of proprioception predisposes to falls in those with DPN, visual compromise owing to concurrent retinopathy and postural hypotension owing to autonomic neuropathy exacerbate the risk of falls. Concurrent diabetic nephropathy is another key complication. Initiation of haemodialysis is associated with at least a threefold higher risk of diabetic foot ulceration and a sixfold higher risk of major amputation.[9]



GODONG/BSIP/ALAMY

Prolonged QTc in those with type 2 diabetes and foot ulceration is a strong predictor of premature mortality

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Improving clinical detection

Early diagnosis of diabetic retinopathy, by using national diabetic eye screening programmes,[11-13] and diagnosis of diabetic nephropathy, through annual checks of urinary albumin-to-creatinine ratio and serum creatinine, are mainstream in the delivery of diabetes care.

Although annual foot examination is also included in the general practice pay for performance, the diagnosis of DPN is less precise and more operator dependent. The elicitation of reflexes and of abnormalities in monofilament and vibration sensations relies on skills that might not be equally distributed across teams within general practice. As recommended by the National Institute for Health and Care Excellence (NICE), monofilament sensation is often the only modality assessed clinically.[18] Despite this, it does not reliably detect early DPN—there is no single test in routine use that provides both high levels of reproducibility between clinicians and high sensitivity.[19] The phenotypic and epidemiological mapping of DPN, compared with that of other microvascular complications, are therefore less evolved.

In England, almost £1bn (€1.1bn; $1.4bn) is spent annually on treating diabetic foot ulcers and performing amputations.[22] In 2015-23 the clinical and cost implications of diabetic foot disease supported an additional investment of around £50m in England to facilitate the development and expansion of capacity of multidisciplinary diabetic footcare services where necessary (given that health is devolved in the UK, quality improvement initiatives are often confined to the individual nations).[23] The incidence of major amputations in England has declined from 9.1 per 10 000 people with diabetes in 2010-13 to 7.7 in 2018-21.[24]

By contrast with the acute complications of DPN, neuropathic pain as a feature of DPN has not attracted the same focus or level of additional investment, despite high associated risks of depression and anxiety.[25] NICE guidelines support drug management of neuropathic pain in non-specialist settings.[26] As highlighted by the authors of the review, there is poor response to many of the treatments available for the management of neuropathic pain—this might change with some researchers now focusing on non-drug treatments.[27]

Further research is needed to identify the determinants of DPN that drive its diverse clinical presentations. Specifically, it remains unclear why certain patients develop neuropathic pain or ulceration while others with similar nerve damage do not. Importantly, reliable diagnostic assessments for DPN are needed to map the burden of the disease, to help inform research in this area and deliver effective and specific interventions. To improve patient outcomes, future research into the pathophysiology and treatment of DPN must account for the systemic burden of diabetic complications.

Cite this as: *BMJ* 2026;393:s854

Find the full version with references at http://dx.doi.org/10.1136/bmj.s854

Identifying and managing pregnancy-related pelvic girdle pain

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CPD READING
0.5 HOURS

A 28 year old nulliparous woman complains of gradual onset pelvic pain at 30 weeks' gestation of pregnancy. The pain is aching in nature and worse on climbing stairs and turning in bed. She denies any urinary or bowel symptoms and has not noticed any fluid or blood loss from her vagina. Fetal movements are normal.

Pregnancy-related pelvic girdle pain occurs in the lumbosacral region, sacroiliac joints, and symphysis pubis joint. It is now the accepted umbrella term to describe pain in the pelvic region during pregnancy.[1]

It is not a normal sequela of pregnancy and is treatable. It can have a considerable impact on the physical and emotional wellbeing of pregnant women. Observational studies suggest that between a third and two thirds of pregnant women experience pelvic girdle or lower back pain at some point during pregnancy, with prevalence increasing as gestation advances.[2 3]

The underlying causes of pregnancy-related pelvic girdle pain are thought to be multifactorial and influence each other. Pregnancy-related hormonal changes may influence ligamentous laxity around the sacroiliac joints and symphysis pubis, but structural "instability" alone does not explain symptoms. Biomechanical factors such as altered load transfer through the pelvis, previous musculoskeletal injury, and muscle deconditioning can contribute.[1 4] Psychological factors, including pain-related fear and low mood, and social factors, such as work demands and caring responsibilities, also influence pain intensity and disability.[5 6] This biopsychosocial model underpins contemporary management approaches.

In this article, we outline how to assess pregnant women with pain suggestive of pelvic girdle pain. Timely referral to pelvic health physiotherapy is recommended when symptoms are functionally limiting, persistent, or not improving with initial management.

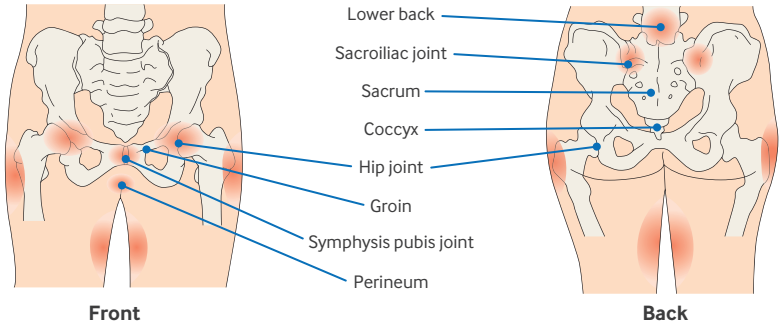


Fig 1 | Distribution of pain in pregnancy-related pelvic girdle pain (red shading). Adapted from the Pelvic, Obstetric and Gynaecological Physiotherapy (POGP) patient information page (see resources for patients)

WHAT YOU NEED TO KNOW

- Pregnancy-related pelvic girdle pain is common, but not a normal sequela of pregnancy; consider the diagnosis in pregnant women with pain in the lumbosacral region, sacroiliac joints, and symphysis pubis joint
- Diagnosis is clinical and supported by focused examination, such as by simple provocation tests when performed by trained clinicians, without neurological deficit
- Provide information, reassurance, and practical advice on activity pacing, sleep, and adaptations, and offer simple analgesia such as paracetamol
- In line with local referral processes, offer referral to pelvic health physiotherapy for women with persistent, functionally limiting, or worsening symptoms; physiotherapy may include education, exercise, and movement strategies

What you should cover

History

- *Pain history*—Ask the pregnant woman to describe the pain, commonly said to be "aching" or "grinding." Sharp pain on movement or a history of a clicking noise or clunking sensation from the region of the symphysis pubis and/or the sacroiliac joint(s) is commonly described. The onset of pain is usually gradual, with pain ranging from moderate to very severe. Uncommonly, it can be precipitated by an injury such as a fall or slip.
- *Location of pain*—The lower back, sacroiliac joint, symphysis pubis, perineum, hips, and groin are most commonly affected. Figure 1 demonstrates the typical patterns of pain distribution.
- *Exacerbating factors*—The pain is usually worse on weight bearing on one leg, so ask about climbing stairs or dressing. Patients can have difficulty with straddle movements, such as getting in and out of the bath, turning in bed, and moving from sitting to standing.[7]

thebmj Visual summary

Pelvic girdle pain: History and examination

Pelvic girdle pain is an umbrella term to describe pain in the pelvic region during pregnancy. It can have a considerable impact on the physical and emotional wellbeing of pregnant people. It is common, particularly in later stages of pregnancy, but should not be considered a normal sequela of pregnancy. It is treatable with analgesia, physiotherapy, or both, along with addressing psychological components. This graphic gives a suggested structure for taking a history and examination. Timely referral to pelvic health physiotherapy is recommended when symptoms are functionally limiting, persistent, or not improving with initial management.

Pain history

Common features include:

Description	Pain type	Other features
Aching	Gradual onset	Sharp pain on movement
Grinding	Moderate to very severe	Clicking noise or clunking sensation

Observations

- Heart rate
- Blood pressure

Identify maternal physiological abnormalities (such as tachycardia, hypotension, or hypertension) that may indicate acute illness

Exacerbating factors

- Usually worse when weight bearing on one leg, such as climbing stairs or dressing
- Straddle movements can be difficult, such as entering a bath or moving from sitting to standing

Urine dipstick

Request microscopy and culture if there are leucocytes, nitrites, or blood detected in urine sample

Gait

A waddling or limping gait may be observed in pelvic girdle pain

Abdominal palpation

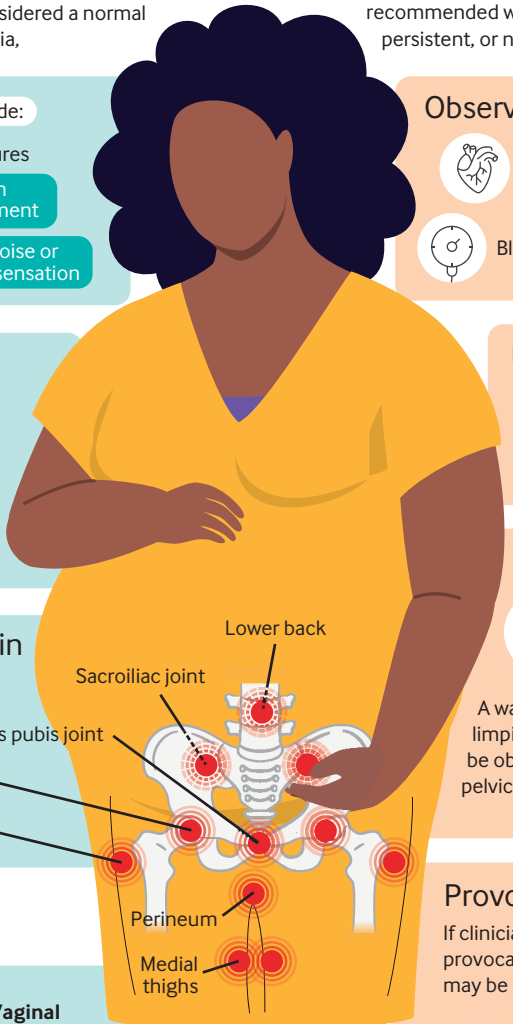
Palpate the abdomen gently, assessing for focal abdominal or uterine tenderness

Risk factors

Often develops in people without risk factors, but may be associated with:

- History of low back pain or pelvic girdle pain
- Higher body mass index
- Multiparity
- Existing musculoskeletal conditions, such as joint hypermobility

Typical pain locations



Differential diagnoses

Urinary

Consider urinary tract infection as a differential

Bowel

Ask about constipation, which can cause or exacerbate pelvic pain

Vaginal

Consider infection if increased discharge or change in appearance

Consider preterm labour or premature rupture of membranes if fluid or blood loss

Provocation tests

If clinicians have been trained to perform provocation tests, identifying positive signs may be useful to aid diagnosis

- Pubic symphysis palpation test
- Active straight leg raise test
- Modified Trendelenburg test

Fetal wellbeing

Ask about fetal movements if >24 weeks gestation

Maternal wellbeing

Ask sensitively about the patient's understanding of what is causing the pain; the presence of depressive symptoms, anxiety, or insomnia

RED FLAGS

- Difficulty initiating micturition
- Impaired sensation of urinary flow
- Loss of sensation of rectal fullness
- Severe or progressive neurological deficit in both legs
- Back pain together with perianal or genital sensation loss

Box 1 | Provocation tests in pregnancy-related pelvic girdle pain[17]

Pubic symphysis palpation test—Position the woman supine and palpate the pubic symphysis with two fingers. A positive test elicits pain or tenderness, typically lasting more than five seconds. It has a sensitivity of 0.60-0.81 and a specificity of 0.85-0.99 for diagnosis.

Active straight leg raise test—Position the woman supine and ask her to raise each leg in turn approximately 6 inches while assessing for difficulty. If lifting is difficult, stabilise the pelvis by compressing the anterior superior iliac spines and ask the patient to try again. Improvement with pelvic stabilisation indicates a positive test. It has a sensitivity of 0.58-0.87 and a specificity of 0.94-0.97 for diagnosis.

Modified Trendelenburg test—Ask the woman to stand and raise one leg. A positive test is indicated by the inability to maintain a level pelvis, with dropping of the contralateral buttock. It has a sensitivity of 0.4-0.6 and specificity of 0.99 for diagnosis.

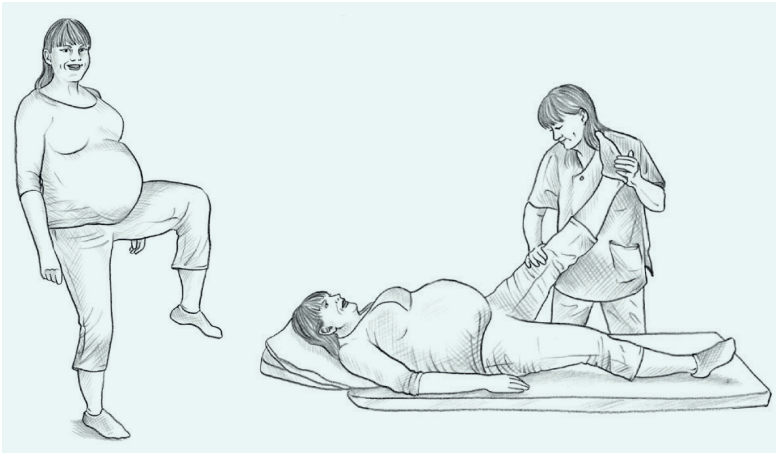


Fig 2 | Provocation tests for in pregnancy-related pelvic girdle pain: modified Trendelenburg test (left) and active straight leg raise test (right)

- *Presence of risk factors*—Pregnancy-related pelvic girdle pain often develops in women with no clearly identifiable predisposing factors. Observational studies have reported associations with a range of biological, psychological, and social factors, including a history of low back pain or pregnancy-related pelvic girdle pain, higher body mass index, multiparity, and pre-existing musculoskeletal conditions such as generalised joint hypermobility.[2] Previous low back pain is the most consistently reported risk factor, reported in approximately half of affected women in observational cohorts, although estimates vary.[8] Other associations demonstrate smaller and less consistent effects between populations. Large cohort and longitudinal studies suggest that risk may increase when multiple factors coexist.[8] Associations with depressive symptoms and work dissatisfaction (largely from observational studies using self-reported measures) have been reported, but findings are inconsistent. Psychological distress may act as both a contributor to and consequence of pain rather than a primary cause.[5 6]
- *Associated symptoms:*
  - *Urinary*—Ask about the presence of dysuria, frequency, urgency, cloudy urine, and whether the patient has had previous urinary tract infections during pregnancy. The presence of these symptoms may suggest a urinary tract infection as a differential and should be treated.
  - *Bowel*—Ask about constipation, which can cause or exacerbate pelvic pain. If present, encourage an increase in dietary fibre and fluid intake, and consider prescribing a short term oral laxative.[9]
  - *Vaginal*—If there is an increase in vaginal discharge or change in its consistency or colour, consider a vaginal swab to assess for infection. Ask about any fluid or blood loss from the vagina, which may indicate preterm labour or premature rupture of membranes and requires urgent specialist assessment.
- *Fetal wellbeing*—From 24 weeks' gestation ask about fetal movements. Reduced or altered movements should prompt immediate referral to a maternity unit.[10]
- *Maternal wellbeing*—Ask sensitively about the patient's understanding of what is causing the pain; the presence of depressive symptoms, anxiety, or insomnia; and what the patient expects for the course of her perinatal and postnatal period. Beliefs that the pelvis is "unstable" or "damaged" are common, and high levels of patient distress can amplify the impact of pain.[5 6]
- *Red flags*—The presence of back pain together with perianal or genital sensation loss, difficulty initiating micturition, or impaired sensation of urinary flow, loss of sensation of rectal fullness, or severe or progressive neurological deficit in both legs requires immediate referral to secondary care for urgent neurologist review to rule out cauda equina syndrome.[11]

Examination

- *Observations*—Check heart rate and blood pressure to identify maternal physiological abnormalities (such as tachycardia, hypotension, or hypertension) that may indicate acute illness and help determine the need for urgent referral.
- *Urine dipstick*—Request microscopy and culture if there are leucocytes, nitrites, or blood detected in urine sample. Consider treating empirically for a urinary tract infection if there are urinary symptoms with a positive urine dipstick.
- *Gait*—Observe the patient entering the room; a waddling or limping gait may be observed in pregnancy-related pelvic girdle pain.
- *Abdominal palpation*—Palpate the abdomen gently, assessing for focal abdominal or uterine tenderness. Interpret findings cautiously, as a normal examination does not exclude obstetric pathology, and concerning features such as pain, rigidity, or guarding should prompt urgent referral for specialist assessment.
- *Fetal assessment*—A general practitioner would not necessarily be expected to assess symphysis-fundal height and should only perform fetal heart auscultation if trained to do so and appropriate equipment is available.

Box 2 | Options for analgesia for patients with pregnancy-related pelvic girdle pain

- Offer regular paracetamol first-line because it is safe to be used in pregnancy.[13]
- Avoid non-steroidal anti-inflammatory drugs (NSAIDs) as symptoms of pelvic girdle pain may persist for prolonged periods (weeks to months) and prolonged use of NSAIDs should be avoided. Use of NSAIDs antenatally, particularly after 20 weeks' gestation, is associated with increased risk to the fetus, including oligohydramnios and premature closure of the ductus arteriosus.[14] NSAIDs can be used postpartum in the absence of contraindications, including during breastfeeding.[15]
- Discourage use of codeine-containing analgesia due to the potential to cause constipation, risk of neonatal withdrawal if used close to birth, and limited additional analgesic benefit for musculoskeletal pain.[16]
- All analgesia options offered in labour and regional analgesia at caesarean birth are safe to use in patients with pregnancy-related pelvic girdle pain.

- *Provocation tests*—If clinicians have been trained to perform provocation tests, identifying positive signs may be useful to aid diagnosis, as they have been shown to have relatively high sensitivity and specificity for pregnancy-related pelvic girdle pain (box 1).[1]
  - Warn the patient that these tests may temporarily reproduce their pain.
  - Palpate the symphysis pubis joint for tenderness.
  - Consider performing an active straight leg raise test and modified Trendelenburg test (fig 2).

Suspect pregnancy-related pelvic girdle pain if the woman has typical symptoms or a positive provocation test.[1] However, a negative provocation test does not rule out pregnancy-related pelvic girdle pain.

In primary care and other first-contact settings, detailed pain provocation tests such as the flexion, abduction, external rotation, and posterior pelvic pain provocation tests are not expected.

Identify psychological component

In the UK, in line with national guidelines on antenatal and postnatal mental health,[12] consider undertaking a validated screening tool such as the Patient Health Questionnaire-9 (PHQ-9) or Edinburgh Postnatal Depression Scale to identify depression and anxiety if the following questions are positive:

- During the past month, have you often been bothered by feeling down, depressed, or hopeless?
- During the past month, have you often been bothered by having little interest or pleasure in doing things?

If clinically significant depressive or anxiety symptoms are identified, acknowledge their potential impact on pain experience and recovery, and manage or refer in line with local perinatal mental health pathways, alongside ongoing management of pelvic girdle pain.[12]

What you should do

Information, reassurance, and advice

Once alternative pathology has been excluded and there are no concerns regarding maternal or fetal wellbeing, reassure that pregnancy-related pelvic girdle pain will not adversely affect the baby. Emphasise that, although the pain can be distressing, the patient's body is not fragile and their bones are not misaligned or "out of place," which is a common concern from patients.[6]

Acknowledge the impact on function and quality of life that the patient is experiencing—which may be substantial and affect mobility and ability to carry out normal activities of daily living such as walking, climbing stairs, turning over in bed, working, and caring for dependants.[2 3] Pregnancy-related pelvic girdle pain alone does not usually affect timing, location, or mode of birth.

Advise patients to follow evidence based approaches to manage pain, including a gradual approach to movement and activity pacing, sleep modifications (such as lying on their side with a pillow between the legs and avoiding asymmetrical lying positions), practical adaptations (for example, dressing while seated, taking stairs one step at a time, and avoiding single-leg weight bearing), and ensuring support from family and work environments (such as altered duties, flexible working, and reduced standing).[6 7] Encourage women to remain as active as they can within their pain limits rather than complete rest. Offer appropriate analgesia as required (box 2). Avoid prescribing specific strengthening or stabilisation exercises without physiotherapy assessment, and instead focus on advice, pacing, reassurance and referral.

Referral

Referral for physiotherapy or specialist assessment should be guided by symptom severity, functional impact, and response to initial management.

Postpartum plan

If appropriate, an individualised plan for postpartum management of pregnancy-related pelvic girdle pain should be agreed between the physiotherapist and women who have substantial pain or functional limitation in pregnancy. Persistent pain after birth is common, and systematic reviews suggest that about one in three women may report ongoing pelvic girdle pain at three months postpartum, decreasing to about one in 10 at two years.[8 18]

Competing interests: None declared.

Cite this as: *BMJ* 2026;392:e088930

Find the full version with references at doi: 10.1136/bmj-2025-088930

HOW PATIENTS WERE INVOLVED IN THE CREATION OF THIS ARTICLE

We invited six women who had experienced pregnancy-related pelvic girdle pain to review the article. They highlighted the importance of acknowledging the impact of pain on work, caring responsibilities, and emotional wellbeing, and asked for practical examples of self management strategies.
Representatives from The Pelvic Partnership, a national charity offering support and information about pregnancy-related pelvic girdle pain, and Pelvic, Obstetric and Gynaecological Physiotherapy (a UK professional network of the Chartered Society of Physiotherapy) reviewed the article.

EDUCATION INTO PRACTICE

- In your setting, how do pregnant women with pelvic girdle pain usually present (for example, to general practice, midwifery services, or emergency departments), and what are the local referral pathways to physiotherapy and related services?
- What information and practical advice do you give to patients about pregnancy-related pelvic girdle pain (for example, written materials, signposting to evidence based online resources, providing workplace letters)?

CPD READING
0.5 HOURS

Ask me how PCOS is affecting my life

Araya Gautum describes the pain and disruption of polycystic ovary syndrome, and how broader questions from healthcare professionals could help

I was 15 when my periods began, and with them came pain so severe that I would miss five days of school every month. The pain was not an inconvenience; it was disabling. I vomited, fainted in the bathroom, and lay curled on the floor while my mother cleaned me up. My education, social life, and confidence quietly eroded, month after month. Each time I sought medical help it was the same. The message I received was that my pain tolerance was low. I was given strong painkillers and sent home: it seemed as though there was no curiosity.

This made me feel dismissed. Each consultation left me smaller than when I entered the room. I began to doubt my own body and my own perception of pain. Perhaps I was overreacting, I wondered. Perhaps this was normal. The absence of investigation felt like an absence of belief.

The painkillers made me drowsy and unable to concentrate, so I relied on caffeine to stay awake and keep up with my studies. This led to gastritis and chronic stomach pain, compounding the problem. I did not understand why my body felt broken or why no one could explain what was happening to me. Without a diagnosis, I had no language for my suffering.

Finding validation

Years passed, and I learnt to minimise my symptoms when speaking to doctors because I sensed that persistence was unwelcome. Living with unexplained, untreated pain led to a low-grade depression that was constant. More than a decade later, exhausted and determined, I finally insisted on further investigation. This time, scans were done. The findings were immediate and validating, leading to a cascade of further tests and biopsies to understand what had been missed for so long.

PRIYA SUNDRAM

Tailored care would have helped me better than generic reassurance

WHAT YOU NEED TO KNOW

- Patients who feel their experience has been dismissed may minimise symptoms or be reluctant to volunteer information about their condition
- Asking about how their condition affects a person's day-to-day life may engender trust and empathy

Empathetic questions

I wish my doctors had understood that not all patients have the confidence or resources to keep advocating. I eventually found my voice, but many never do.

Empathy would not have required dramatic gestures. It might have sounded like, "I can see this is affecting your education and your quality of life. Severe pain like this is not something you should simply tolerate." It would have involved asking structured follow-up questions: "When did the pain begin? Has it changed over time? Do you miss school every month? What happens on your worst days? How is this affecting your mood?" I felt each visit was treated as an isolated episode and that opportunities to recognise the pattern might have been lost as a result.

It might have helped if my healthcare provider had explained, at each step, what management or treatment they would recommend or provide (and why) so that I knew what to expect. I would have appreciated a scheduled review. Even a brief follow-up call or message asking, "Has this improved?" would have signalled that my symptoms mattered beyond the consultation room.

Most importantly, tailored care would have helped me better than generic reassurance. Instead of stronger analgesia alone, I would have liked correlation of symptoms over time, discussion of differential diagnoses, and acknowledgment of the significance of repeated functional impairment in an adolescent.

To me, effective listening means synthesising what the patient says across time and responding accordingly. Had that happened earlier, I might have understood that my pain was not a personal weakness, but a clinical problem. That recognition might have helped me feel heard rather than dismissed, and more confident in seeking help without shame or self-doubt.

Patient author

Cite this as: *BMJ* 2026;393:s708

EDUCATION IN PRACTICE

- What questions do you ask about a patient's daily experience with a chronic condition or pain?
- How might you explain the next steps in a patient's care, when they have previously felt dismissed or overlooked?

SPOT DIAGNOSIS

Weakness after antifungal use

A man in his 40s presented to the dermatology clinic with a pedal rash and the patient was diagnosed as having tinea pedis. He was prescribed oral terbinafine (250 mg once daily), aiming for a course of up to three months. Three days after starting terbinafine, he described generalised muscle weakness, weak grip strength, and difficulty standing from sitting. He did not describe any preceding intense exercise or dehydration. On urgent review in clinic, he had 5/5 power in his upper and lower limbs, bar 4/5 grip strength bilaterally. A urinalysis was not performed because it was not available at the clinic. The table presents the blood test results, which showed increased creatine kinase levels and normal results for liver function tests.

What is the most likely diagnosis?

Submitted by Ellen Richards and Alistair Brown
Patient consent obtained.
Cite this as: *BMJ* 2026;392:e082853

Relevant laboratory test results five days after initiation of terbinafine

Test	Result (normal range)
Sodium (mmol/L)	140 (133-146)
Potassium (mmol/L)	3.8 (3.5-5.3)
Creatinine (µmol/L)	85 (59-104)
Alanine aminotransferase (IU/L)	34 (0-41)
Total bilirubin (µmol/L)	8 (0-21)
Alkaline phosphatase (IU/L)	54 (30-130)
Albumin (g/L)	43 (35-50)
Creatine kinase (U/L)	1342 (40-320)
Calcium (mmol/L)	2.34 (2.05-2.55)
Phosphate (mmol/L)	0.97 (0.80-1.50)

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answers

SPOT DIAGNOSIS **Weakness after antifungal use**

Drug induced rhabdomyolysis secondary to terbinafine. Rhabdomyolysis is a clinical syndrome that results from myocyte breakdown, resulting in the release of intracellular muscle constituents (commonly creatinine kinase and myoglobin), causing electrolyte disturbances and multiorgan failure in severe cases. The most common causes are trauma, exercise, and drugs such as statins, antipsychotics, lithium, and illicit drugs. Data on specific drug induced rhabdomyolysis are available largely through case reports.

The classical clinical presentation is a triad of weakness, myalgia, and dark coloured urine (myoglobinuria); however, this is observed in <10% of patients. The clinical presentation can be mild (with a slightly raised creatine kinase level) to severe (with complications such as compartment syndrome, acute kidney injury, and disseminated intravascular coagulation).

There are no standardised criteria for diagnosis of rhabdomyolysis; however, the laboratory diagnosis is usually based on raised serum creatine kinase levels with many clinicians using three to five times the upper limit of normal for creatine kinase, or >1000 IU/L, coupled with acute muscle weakness, myalgia, and muscle swelling.

Investigations to consider include urinalysis for myoglobinuria (which may be negative owing to rapid clearance); renal, liver, calcium, and phosphate blood tests; coagulation screen; and electrocardiography in cases of electrolyte disturbance.

Management focuses on fluid resuscitation, preventing acute kidney injury, correcting electrolyte abnormalities, and preventing complications. Identify the underlying cause and discontinue any offending drugs.

Use clinical judgment in an outpatient setting to guide whether patients need oral rehydration in the community, or should be admitted to hospital for intravenous fluids. Things that might prompt admission to hospital include poor urine output, rising creatine kinase levels, escalating symptoms, electrolyte abnormalities, or not being able to take oral rehydration.

LEARNING POINTS

- The classical clinical presentation of rhabdomyolysis includes muscle weakness, myalgia, and dark coloured urine. A serum creatine kinase concentration of >1000 IU/L or three to five times the upper limit of normal would be considered diagnostic.
- The most common causes of rhabdomyolysis are trauma and adverse events from drugs (including statins, antipsychotics, lithium, and illicit drugs).
- Treatment prioritises fluid resuscitation with the aim of preventing acute kidney injury. Consider outpatient management with close monitoring of bloods if patients are well and have no electrolyte disturbances, a normal urine output, and improvement in symptoms.

PATIENT OUTCOME

See bmj.com.

CPD READING
0.5 HOURS

You can record CPD points for reading any article. We suggest half an hour to read and reflect on each.

LEARNING MODULE

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